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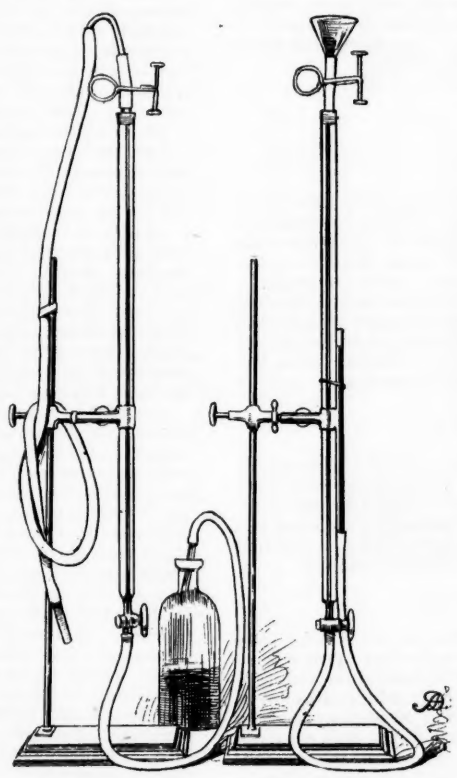
[ORIGINAL COMMUNICATION.]

AN EXTEMPORANEOUS NITROMETER FOR THE ASSAY OF SPIRITUS ÆTHERIS NITROSI.*

BY WILLIAM P. DE FOREST, BROOKLYN, N. Y.

PROF. A. H. ALLEN, of England, was the first to propose that the volume of gas given off by the combination of spirit of nitre, solution of iodide of potassium, and diluted sulphuric acid, measured in a nitrometer, should be used to determine the percentage of ethyl nitrite in the spirit of nitre under examination. This reaction has been shown to you before, and my object this afternoon is simply to demonstrate how easy it is for any one who does not own, and who does not wish to spend three or more dollars for, a nitrometer, to make one for himself at but little cost and little trouble. As volumetric solutions are officinal, and many of the articles of the U. S. P. are directed to be assayed by them, a burette is essential for their use; and as all the members of this Society are supposed to follow the directions of the Pharmacopœia, I must assume that all the gentlemen before me to-day own a burette. In the top of the burette fits tightly a rubber cork, through which passes a glass tube of not more than 1½ inches in length, provided with a piece of rubber tubing of about the same length. Over the lower end of the burette is slipped a piece of rubber tubing of about 2 feet in length, in the free end of which is inserted a piece of glass tubing 1 foot in length. Another piece of rubber tubing, about 3½ feet long, with a small piece of glass tubing in each end, is needed to be attached to the tube in the rubber cork, also a glass funnel of about 3 or 4 drachms capacity, an ordinary 8-ounce bottle, and a pinchcock. These comprise the whole outfit, except the solutions, which consist of a solution of iodide of potassium (2 in 5) and diluted sulphuric acid (2 in 6), a saturated solution of salt, and a sample of spirit of nitre.



De Forest's Nitrometer.

The space in the burette between the rubber cork and the first graduation of the tube must be ascertained, as that has to be added to the rest of the figures. In the burette I am using this afternoon I have found this space to measure 7.75 C.c.

I now place my rubber cork in the burette and tie it down securely, fill my 8-ounce bottle with the brine, and place in it the glass tube of the rubber attached to the lower end of the burette. The longer piece of rubber tubing I connect with the rubber cork. By sucking I fill the burette and the little glass tube with the brine, and compress the small piece of rubber tubing on top with the pinchcock; then taking off the long rubber tube on top, I put in its place the glass funnel. Measuring out 3 C.c. (48 min.) of spirit of nitre, I place that in the funnel, and very carefully opening the pinchcock, let it down into the burette. This is followed by 5 C.c. (81 min.) of the solution of iodide of potassium, and after that has been passed into the burette, 5 C.c. (81 min.) of the diluted sulphuric acid are run in in the same manner, care being taken each time not to admit any air with the liquids.

The reaction commences immediately, and by raising the bottle of brine, withdrawing the glass tube, fastening it to the burette so that the liquid in both will be on the same level, you will very soon be able to read off the volume of gas obtained. In the experiment I have just performed I find the liquid in the burette has been forced down to the mark 26.5 C.c. Adding to this 7.75 C.c., the measure of the space above the markings, makes 26.5 C.c. + 7.75 C.c. = 34.25 C.c. This represents the amount of gas disengaged from the 3 C.c. of spirit of nitre. Dividing this by 6.66 (see below) will give the per cent of ethyl nitrite: 34.25 ÷ 6.66 = 5.14 per cent; and this is about the percentage of ethyl nitrite that the sample I have here contains. Of course this is not claimed to be absolutely accurate, but it will give an approximate idea of how strong your sample of spirit of nitre is, and it is a handy method, within the reach of any druggist. The reason I take 3 C.c. of the spirit of nitre is this, that my tube is not long enough to allow the reaction to take place successfully if 5 C.c. of spirit of nitre containing 5 per cent ethyl nitrite were employed.

The spirit of nitre I have assayed this afternoon was made by myself in my pharmacy yesterday, after the process proposed by Dr. Squibb in the *Ephemeris* for July, 1888.

The divisor 6.66, mentioned above, is used on the authority of Dr. Squibb (see *Ephemeris*, July, 1889), who, after a number of experiments with a solution of pure ethyl nitrite in absolute alcohol, found that 3 C.c. of a 5-per-cent solution liberated, on the average, 33.33 C.c. of gas; the same quantity of a 1-per-cent solution would liberate 6.66 C.c. of gas. So in order to determine the amount of ethyl nitrite in 3 C.c. of the spirit of nitre under investigation, it is necessary to divide the number of cubic centimeters of gas obtained by 6.66, and the quotient will be the percentage. If a larger tube be used, one twice as large or four times as large as an ordinary burette, and the amount of spirit of nitre increased to 5 C.c. or 10 C.c., a different divisor would have to be employed. For 5 C.c. it would be 11.11, and for 10 C.c. it would be 22.22. Of course in each case the amount of gas obtained would be proportionately larger and the result the same as for the 3 C.c.

* Read before the Kings County Pharmaceutical Society, April 8th, 1890.

A New Spice Adulterant.

FRANK A. HENNESSY, PH.G., contributes to the *American Journal of Pharmacy* a description of a substance which has been placed on the market as an adulterant for ground spices, known as "spice mixtures." The manufacture is conducted in a large bakery in Philadelphia.

The substance forming the basis of these mixtures, and known as "meal," was found to be a low grade of wheat. It is not known among millers by any special name, but might be called "blow-room stuff." It is a little better than feed, to which it is sometimes added to improve the quality, but is a lower grade than middlings. The meal is made into dough with water, rolled out and cut in the same manner as soda crackers, and baked in an oven. These crackers, or biscuits, as they are termed, are then allowed to dry thoroughly, when they are ready for grinding. The different shades are obtained by the use of coloring matters mixed with the meal in the preparation of the dough.

The "white" biscuit is made from the plain meal without coloring. The "yellow" is made with the aid of turmeric, a little of which goes a great way in imparting a rich yellow hue, such as is peculiar to mustard.

A sample of the coloring matter used in the "brown" biscuits is also presented. An analysis shows this to be a mixture of about equal parts of Spanish brown and turmeric.

Charcoal is used in the "black" biscuits.

Some biscuits having a red color, such as might have been used to adulterate Cayenne pepper, were seen, but it was impossible to secure samples at the time.

Large quantities of these spice biscuits have been delivered to a spice house in Philadelphia, and it is not known that any have been shipped out of the city. As they are all sent to the spice dealers in the whole condition, probably on account of the lack of facilities for grinding, the samples of powder which are presented were ground by the writer in a small drug mill, and may only roughly resemble the powders prepared by these spice millers.

However, they will serve to show how closely the ground spices may be imitated.

The sample labelled "pepper mixture" is made up of

the "black," "white," and "brown" powders; the one labelled "clove mixture," of the "brown" and "black."

"Cracker dust" is said by many investigators to be used as a spice adulterant, and a sample of this material from the same bakery is presented, although it has never been used in the manufacture of these biscuits. It consists altogether of stale bread, which accumulates in large quantities, and which is thoroughly dried and ground.

An analysis of the spice biscuits gave the following results, the "black" and "white" powders and the original meal being taken:

	White.	Black.	Meal.
Moisture	7.52	8.27	.....
Soluble ash (HCl)	3.00	4.98	2.95
Insoluble ash (HCl)	Trace.	4.45	.....
Total ash	3.00	9.43	2.95
Glucose	14.51	14.51	14.51
Cane sugar	6.03	3.02	11.02
Residue after treatment with cold H_2O and dried at 100° C.	75.8	88.2	65.8
Charcoal and matter insoluble in boiling H_2O	.....	54.1	.....
Ash of same	.....	15.57	.....

The ash consisted of Na, K, Cu, Mg, chiefly as phosphates, with some sulphates, the insoluble portion of the "black" being fine sand.

It is evident that without the most careful examination the presence of these mixtures in ground spices might often escape notice. The starch granules are usually so much altered in the process of baking as to render their identification almost impossible.

As pure ground pepper, for instance, yields:

Moisture	8–10
Ash	2–5
Starch	34–43
Total reducing sugar equiv.	42–55

it is obvious that in case of admixture with this material the determination of any or all of those constituents would be of no value, and it is probable that the only reliable results would be obtained from estimating the amount of piperine and resin, which is quite constant.

Some points of similarity to other spices might be mentioned to show how admirably these mixtures are adapted to their purpose; but the object of this paper is simply to call attention to what is believed to be the latest development of inventive genius in this direction.

Sozoiodol Salts.

As the potassium, sodium, lithium, zinc, and mercury compounds with di-iodo-paraphenol-sulphonic acid have been now adopted to some extent in medical practice under the name "sozoiodol salts," the following information as to their physical and chemical properties, published by H. Trommsdorff, of Erfurt, may be of some use.

GENERAL REACTIONS.

1. *Potassium Chlorate and Hydrochloric Acid.*—It is characteristic of all the sozoiodol salts that upon warming them in aqueous solution with potassium chlorate and hydrochloric acid, chloranil (tetrachlorquinone) is formed, which separates in shining gold plates. As the odor of chloranil is very intense and definite, this reaction allows of the detection of sozoiodol even when very much diluted. But since phenol and phenolsulphonic acid behave similarly, it is necessary also to test for iodine, which can be done by the following reaction:

2. *Nitric Acid* (1 : 4).—All sozoiodol salts, upon being warmed with nitric acid, give picric acid, which separates in yellow scales, and at the same time iodine vapor is evolved. The nitric acid should be in considerable excess, and the heating continued until all the iodine is driven off.

3. *Sulphuric Acid.*—Upon heating the dry salt with concentrated sulphuric acid, iodine is immediately volatilized, and there is, at the same time, a formation of iodophenol, recognizable at once by its extremely disagreeable odor.

4. *Ferric Chloride Solution.*—All soluble sozoiodol salts give with a few drops of this solution an intense blue-violet color, which after a time passes to red-violet.

5. *Bromine Water.*—When bromine water is added to a soluble sozoiodol salt, iodine is set free and can be shaken out of the solution by means of carbon bisulphide.

6. *Barium Chloride Solution* (1 : 20).—All soluble sozoiodol salts give with this solution a strong white precipitate, which after a time changes into needles and consists of barium sozoiodolicum. It dissolves upon addition of ammonia, even in the cold, and also in much hot water.

7. *Silver Nitrate Solution* (1 : 20) gives, with the water-soluble sozoiodol salts, a white micro-crystalline precipitate of silver sozoiodol, which is also easily soluble in excess of ammonia.

8. All sozoiodol salts, upon being heated, give off the red-violet vapor of iodine, sometimes with and sometimes without puffing up.

TESTING OF SOZOIODOL SALTS AS TO THEIR PURITY.

The *Potassium Sozoiodolicum* occurs in commerce as a fine white crystalline powder, which, upon being heated on platinum foil, puffs up in an extraordinary manner (resembling almost the so-called Pharaoh's serpents); at the same time the very disagreeable odor of iodophenol is given off. If a portion be completely incinerated, the ash dissolved in water, and first hydrochloric acid and afterwards platinic chloride added, the well-known yellow precipitate of potassium platinochloride is formed. Potassium sozoiodol is insoluble in alcohol, but 0.5 Gm. finely powdered dissolves in 50 C.c. of water at 15° C. by simply shaking it round; 20 C.c. of this solution, treated with 2 drops of silver solution, give a white precipitate, which should dissolve in dilute nitric acid (concentrated acid liberates some iodine). At most, immediately, not more than a quite faint opalescence should remain (traces of chlorine). If there should be a yellowish-white turbidity it would indicate that the preparation contained free iodine. This may be the case when the contents of a bottle, through frequent opening, have been allowed to get damp, to which special attention is called. If a few drops of barium chloride solution (1 : 20) be added to the above-mentioned potassium sozoiodol solution, the resulting white precipitate should dissolve completely without turbidity upon warming in water. A few drops of dilute sulphuric acid added to 10 C.c. of the above solution should give no turbidity (barium). Ammonium sulphide solution and sulphuretted hydrogen water should not render turbid a solution of 0.5 Gm. of the salt in 50 C.c. of water. Bromine water, shaken with a solution of 0.5 Gm. of the salt in 50 C.c. of water, should not cause turbidity, but only color it yellow (a milky turbidity would indicate potassium-phenol, as tribromphenol).

The *Sodium Sozoiodolicum* comes into commerce in white, prismatic needles, with a taste at first astringent and afterwards sweetish. One grain dissolves easily in 20 C.c. of cold water, but even in lukewarm water the solubility is essentially increased. In warm glycerin the solubility is almost the same. In hot alcohol, especially aqueous alcohol (80 per cent), it is soluble up to 5 per cent. When heated upon platinum foil it does not puff up; and the residual white fused mass gives a yellow flame when heated on a loop of platinum wire. Towards silver solution, barium chloride, dilute sulphuric acid, sulphuretted hydrogen, ammonium sulphide, and bromine water it behaves exactly like the potassium compound.

The *Lithium Sozoiodolicum* appears in shining white plates, which sometimes assume a faint yellowish tinge without affecting its purity. It dissolves easily in water and aqueous alcohol. The incinerated salt, heated on platinum wire, gives a carmine-red flame. Toward silver solution, barium chloride, and dilute sulphuric acid it behaves like the potassium salt.

Zincum Sozoiodolicum crystallizes exactly like the sodium salt, in long white needles, which sometimes, when kept for a long time, assume a very faint reddish tinge. It does not puff up when heated, and leaves a yellow powder. It dissolves in alcohol much more easily than in water. The solubility of the salt in cold water is 1 : 50; warm water dissolves it abundantly, about 5 : 100 remaining in solution after cooling. One Gm. of the salt dissolves easily in 10 Gm. of alcohol at the ordinary temperature. Towards silver solution, barium chloride, dilute sulphuric acid, and bromine water it behaves like the potassium salt. With ammonium sulphide it gives a yellowish-white precipitate.

The *Hydrargyrum Sozoiodolicum* appears in commerce as a deep citron-yellow, extremely fine and light powder. It is said to be sent out containing a constant proportion of 32 per cent of mercury, corresponding to the formula:

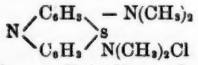
$$C_6H_2I_2\begin{matrix}O\\SO_3\end{matrix}\!\!>\!Hg$$

Upon being heated it puffs up like the potassium salt and volatilizes rapidly without leaving any residue. In water and in alcohol it is practically insoluble. On the other hand, 0.5 Gm. of the salt should dissolve easily when shaken in 30 C.c. of a 5-per-cent solution of sodium chloride; the solution should contain no white or yellowish-white suspended precipitate, or, at most, there should be a faint milky turbidity. If 0.5 Gm. of the salt be dissolved in 50 C.c. of water with the aid of a little nitric acid, 2 drops of silver solution added to 10 C.c. of this solution should show at most a trace of opalescence (chlorine). The solution should not be rendered turbid by 2 or 3 drops of barium chloride solution or by dilute sulphuric acid; at most there should at first be only a turbidity, disappearing on the addition of the sulphuric acid. With ammonia a solution of the salt in sodium chloride gives a yellowish-white precipitate passing into gray, and with sulphuretted hydrogen a black precipitate. The quantitative determination of the mercury may be effected by dissolving 2 Gm. of the compound in 5-per-cent sodium chloride solution, adding 1 or 2 drops of hy-

drochloric acid, and precipitating with sulphuretted hydrogen; the sulphide is then dried at 100° C. upon a tared filter.—*Pharm. Trans.*, June 21st.

Methylene Blue as an Anodyne.

THE fact that "methylene blue," a diphenylamine compound, when used in staining histological specimens, manifests a remarkable affinity for nerve tissue, and especially for the axis cylinders of the sensible and sensor nerves, suggested to Messrs. Ehrlich and Leppmann that it might prove to possess anodyne properties when introduced into the system (*Deut. med. Woch.*, June 5th, p. 493). This idea has received therapeutic confirmation in the Moabite Hospital, Berlin. It was carried out first with injections of a solution of a zinc-free compound, but a concentrated solution failed to yield a sufficient dose in the quantity thought desirable to be injected at one place (about 4 C.c. of a 2-per-cent solution), and similar negative results attended the use of a preparation of the acetate. It was therefore administered as a fine powder enclosed in gelatin capsules, containing each from 0.1 to 0.5 Gm. (1¾ to 8 grains), the highest daily dose being 1 Gm. (16 grains). The rapid passage of the methylene blue into the blood, even after the smallest doses, was clearly evident, since a quarter of an hour after its internal administration or injection the urine became pale green, in two hours blue green, and in four hours dark blue, but no pathological constituents were found in the urine. A bluish coloration was also observed in the saliva and fæces; but no bluish tinge of the skin, mucous membrane, or of the sclera was ever observed. It was found that in all definite forms of painful local affections—as, for instance, in all neuritic processes, and in rheumatic affections of the muscles, joints, and tendon sheaths—it acts as an anodyne. The action is, however, somewhat peculiar, in that its effect is only manifested some time after administration, usually about two hours; but when suitable internal doses of 0.1 to 0.25 Gm. (1¾ to 4 grains) are administered, it goes on increasing gradually, until after a considerable interval the stage of painlessness is attained. The explanation of this slow action suggested is based upon observation of what takes place when methylene blue is injected into living nerve tissue. The coloration of the nerves that takes place immediately undergoes alteration; in the course of an hour the diffuse blue staining disappears, and instead irregular, intensely blue granules make their appearance in the axis cylinders of the nerve origins, the granules being eventually eliminated, probably mechanically, from the nerves. It is suggested, therefore, that there is a formation of an insoluble compound from the coloring substances and certain constituents of the nerve substance, which alters the chemical condition of the nerves and produces temporarily an anodyne effect. In agreement with this the action appears to be purely anodyne, and the compound produces no direct influence upon inflammatory swellings or effusions into the joints or tendons. No ill effects were observed to follow its long-continued use, and the injections are described as being almost painless. The substance used by Messrs. Ehrlich and Leppmann, and described by them as chemically pure methylene blue, free from zinc chloride, and beautifully crystalline, was probably the tetra-methyl-thionine chloride—



which crystallizes in small indigo-colored scales, with a tinge of copper or bronze on the principal surface and of cantharis green on the transverse fracture, and readily gives a 2-per-cent solution (*Annalen*, cxxx., 143). Formerly commercial "methylene blue" consisted of a double chloride of zinc and tetra-methyl-thionine, which accounts for a material *free from zinc* being now specified. The free "methylene blue" base—tetra-methyl-thionine hydroxide—when dried over sulphuric acid, forms a dark amorphous mass, showing a green metallic lustre when triturated; it dissolves readily with a small quantity of water to form a syrup, and is also very freely soluble in alcohol. Solutions of the chloride give with sulphuric acid a grass-green coloration, and with strong solution of caustic potash a violet-black precipitate.—*Pharm. Journ.*

Sulphocyanide as a Test for Albumin in Urine.

ACCORDING to Zuchlos, a mixture of potassium sulphocyanide and acetic acid is a more delicate test for albumin in urine than the potassium ferrocyanide and acetic acid solution, over which it also has the possible advantage of being colorless. It is prepared by mixing 10 C.c. of a 10-per-cent solution of potassium sulphocyanide with 2 C.c. of acetic acid. A few drops of this liquid, which can be kept unaltered for a considerable time, added to an albuminous urine, produces a turbidity or a precipitate according to the quantity of albumin present. Potassium sulphocyanide and succinic acid are said to act in a similar manner, and, as these can be carried about separately in the dry state, Zuchlos suggests that they would be convenient for clinical use; a mixture of the two is apt to deliquesce, but this could be avoided by enclosing it in gelatin capsules.—*Pharm. Centralh.* and *Ph. Journ.*

BULOW'S COMPRESSED-TABLET MACHINE.

WE give here an illustration and description of an improved tablet machine constructed by Mr. Bülow, of Goerlitz, Germany.

The frame of the press is formed of two strong wrought-iron pillars joined by two cross-pieces. The upper one of these, through which passes the screw worked by a horizontal lever wheel, is made of thick wrought iron, so as to be able to resist a strong pressure. The screw itself has a square thread, and is made to work rapidly and easily up and down. Its force is applied to a stamp guided by the lower cross-piece. At the lower end of the stamp is a central pin, which merely guides the stamp and also forces out the compressed tablets.

The novelty of this machine consists in this, that the tablets are not produced by applying the stamp or form from *above* upon the prepared powder, but the stamps are attached to a lower plate, travelling on rails, and the tablets are formed by the stamps entering corresponding holes in the plate or disc at the end of the screw. When compression is accomplished the covering plate is removed, and a slight extra twist of the screw causes the tablets to be pushed out above. The stamp plate is then drawn out, the tablets removed, and the plate replaced, when the same process is gone through again.

A very material advantage of this machine is an adjustable arrangement by means of which the quantity of

Bülow's Compressed-Tablet Machine.

powder required to produce the tablets, after being once accurately determined, is automatically delivered to the several forms. Experiment has shown that the difference in weight between the several tablets thus produced is not greater than when they are weighed in the ordinary way.

This machine is supplied in two sizes. Each has cylinders and stamp plates for four different sizes of tablets.—After *Pharm. Zeit.*

The Areca Nut.

A PAPER on "The Narcotics and Spices of the East," recently read by Dr. Dymock before the Anthropological Society of Bombay, contains some interesting points about the areca nut—the *supari* [this is the Hindustani name; there are many others in use.—ED. AM. DR.] of the natives, and the betel nut of the Europeans. Few persons, says Dr. Dymock, have any idea of the consumption of the nut in India; but, as a matter of fact, 100,000,000 people eat it every day of the year. It is well known to the natives that the fresh nuts have intoxicating properties and produce giddiness, and that the nuts from certain trees possess these properties to an unusual extent, and even retain them when dry. These intoxicating properties are much diminished by heat, and as the nuts which possess them are apt to be mixed up with the common sort, many cautious people decline to use any except the red nuts of commerce, which have all undergone a process of cooking. Dr. Dymock inclines to the opinion that the original wild nut must have been an intoxicant, especially as the unripe nuts of the best trees produce slightly intoxicating effects. The betel leaf or pan, with which natives eat the areca nut, is highly esteemed, and its thirteen properties are enumerated in the ancient books of the Hindus.—*Chem. and Drugg.*

The Constituents of Cod-Liver Oil.

M. GAUTIER and L. MOURGUES have made a detailed study of cod-liver oil and its constituents, the results of which were published in the *Journal de Pharm.* (March 1st, 253). We give an abstract (after *Pharm. Journ.*) of the more important parts of their paper:

In operating for the separation of the alkaloidal and other principles from cod-liver oil, the authors treated 100 Kgm. of the oil methodically with an equal volume of 35-per-cent alcohol containing 3 Gm. of oxalic acid per liter. The oil was shaken with the alcohol in 20 glass bottles, each of 15 liters' capacity, the free part of which was filled with carbonic acid to avoid the action of air upon the oil. After standing, the alcoholic liquid was siphoned off, exactly neutralized with milk of lime, and evaporated *in vacuo* at a temperature not exceeding 40° C. Under these conditions the mixture remained limpid and nearly colorless. When it had been reduced to one-one-hundredth of its original volume, it was neutralized by precipitated calcium carbonate, filtered, and the desiccation finished *in vacuo.*

If it be desired simply to extract from the residue the total basic substances it contains, without regard to the manner in which they are combined, the product of the evaporation is treated with 80-per-cent alcohol, and the extract is filtered or distilled until all the alcohol is passed over, and the residue concentrated *in vacuo.* In this way a syrupy extract is obtained, to which caustic potassa is added in fragments to liberate the bases. These are separated by shaking the mixture with ether, then precipitating the bases from the ethereal solution of oxalic acid, washing the precipitate with ether, and drying. The scarcely colored dry oxalates obtained from 100 Kgm. of oil weighed 52 Gm.

In order to obtain the bases free, the salt is dissolved in the smallest quantity of water, and the solution is treated with caustic potassa. Under this treatment the alkaloids usually rise to the surface like a thick brown oil, which is due to the solution of two fixed bases in the oily bases.

The treatment with alcohol acidulated with oxalic acid removes from the oil nearly the whole of the bases. In the authors' experiments, the quantity obtained varied between 0.380 Gm. and 0.485 Gm. per kilogramme of the brown oils; but from the pale oils the yield was inappreciable, even when operating upon 10 Kgm. If account be taken of the fact that a trace of basic substances remains in the oil after treatment with acidulated alcohol, it will be seen that the total bases contained in a kilogramme of *brown* oil amount to about *half a grain.* That would be about 6.5 Mgm. of base, or 10 Mgm. of the sulphates in each tablespoonful (13 Gm.) of oil—a quantity that, considering the powerful action of these bases, cannot be without effect on the economy.

Twenty-five grammes of the mixture of oxalates dried over recently fused caustic potassa, yielded 12.5 Gm. of anhydrous bases. These were submitted to careful fractionation, first in air up to a temperature of 120° C., and then *in vacuo.* Different alkaline liquids passed over in succession, and there remained a brown magna of bases that were solid or could not be distilled without decomposition.

These were separated by converting them into hydrochlorides or platinochlorides.

After careful repetition of these operations, the bases in cod-liver oil were classified as follows:

1. Fraction boiling at 87° to 90° C., under a pressure of 770 Mm.—*butylamine.* This portion constituted about one-sixth of the total bases.

2. Fraction boiling from 90° to 100°, under the same pressure, with a fixed point 97° and 98°—*amylamine.* This fraction constituted one-third of the whole.

3. A small fraction boiling above 100° and below 115°, consisting especially of *hexylamine.*

4. Fraction boiling towards 100°, under a pressure of 600 Mm. of mercury, or at from 190° to 200° under ordinary pressure. This consists of a new base, *dihydrotoluidine,* and constituted about one-tenth of the total alkaloids.

5. The fifth portion included the fixed bases. The basic residue that could not be distilled, being treated with dilute hydrochloric acid, dissolved almost completely. This solution, which was slightly colored, gave immediately with platinic chloride a flesh-colored precipitate, alterable in light, which was separated from the mother liquor and dried upon porous porcelain. From this platinochloride a hydrochloride was prepared, from which a fixed base, named by the authors *aselline,* was obtained by precipitation with potassa.

Upon concentrating the mother liquor, a second platinochloride, much more soluble than the first and of constant composition, was deposited to the end. From this was obtained a sixth alkaloid, that constituted about one-third of the total alkaloids of the oil. This substance, which is considered by the authors to be one of the most efficacious principles in cod-liver oil, has been named *morrhuine.*

There remained in the potassic liquor, after the basic substances had been removed, the different fixed and volatile oils with which the bases were combined when dissolved out by the acidulated alcohol. To this liquor, exhausted by ether, was now added a little sulphuric acid, and the following acids were obtained:

1. A remarkable acid, which appears, especially when the liquor is heated a little, as a brown, viscous mass, slightly soluble in water, having a disagreeable, slightly aromatic odor, recalling that of oils derived from marine algæ. It solidifies slowly in the cold and may be obtained crystalline after purification. The authors have named it *morrhuic acid.*

2. Upon distilling the acidulated liquor, after the morrhuic acid had been separated, there passed over a mixture of *formic* and *butyric acids.*

3. There still remained in the liquor (*a*) a small quantity of morrhuic acid in solution, removable by alcoholic ether when the solution had been evaporated; (*b*) a certain proportion of phosphoric acid, derived from the phosphates, phosphoglycerates, and lecithines of the oils; (*c*) a little sulphuric acid having the same origin.

4. These various acids having been separated, the residue was finally precipitated with subacetate of lead. After having filtered and removed the lead, strong alcohol took up an extract having a nauseous odor. In the fractions of this extract boiling towards 180° *in vacuo,* the presence of glycerin was determined by converting it into acrolein. Glycerin, therefore, accompanies phosphoric acid in the complex substances removed by alcohol from cod-liver oil, being partially combined with it; for after neutralization of the acid extract with lime, phosphoric acid again makes its appearance in the liquor if it be boiled with a mineral acid. Phosphoric acid and glycerin are in fact contained in these oils in the form of lecithines.

The foregoing, with traces of coloring matters, are the alkaline and acid constituents separable from cod-liver oil. Among them only butyric, phosphoric, and sulphuric acid had been noticed before. The special constituent which communicates to cod-liver oil the characteristic property of giving a fine violet color when treated in the cold with strong sulphuric acid, is not met with in the acidulated extract, alcoholic or aqueous.

Referring to the properties of these constituents, the authors state that *butylamine,* in sufficient dose, produces in animals fatigue, stupor, vomiting, and a certain degree of paresis; it excites the production of urine.

The *amylamine* from cod-liver oil is a very active base. In a small dose it excites the reflexes and promotes the urinary secretion. In a large dose it provokes convulsive trembling, then true convulsions and death.

Hexylamine has an action very similar to that of amylamine, but much less intense.

Dihydrotoluidine ($C_7H_{11}N$) occurs as a colorless oil, having a brisk, not unpleasant odor, very alkaline and slightly soluble in water, upon which it floats. It attracts carbonic acid strongly from the air. Its hydrochloride is bitter and crystallizes in very soluble, confused needles or lamellæ. The nitrate reduces silver nitrate. The yellow platinochloride is readily precipitated, but is redissolved by heat. The aurochloride, soluble in the cold, forms long needles, arranged like a fan. *Dihydrotoluidine is a convulsive toxic base.*

Aselline occurs as a non-hygroscopic, amorphous mass, with a density of 1.050. It turns yellow in air and light. When cold it is odorless; but it melts at about 100° C., and the viscous liquid has a sweetish, aromatic odor, recalling that of some ptomaïnes. Aselline is very slightly soluble in water, to which it communicates a faint bitterness and alkalinity. It is soluble in ether and especially in alcohol. The salts formed by it with acids are crystalline, but dissociate partially in water, especially when heated. In a sufficient dose aselline produces dyspnœa, stupor, convulsive disturbances, and with a still larger dose, death.

Morrhuine ($C_{19}H_{27}N_3$) is a very thick, oily liquid, with an odor recalling that of lilac or acacia flowers. It is lighter than water, in which it is slightly soluble, and is very soluble in alcohol and in ether. It is very alkaline and caustic to the tongue, and attracts a little carbonic acid from the air. The hydrochloride crystallizes in stars formed of acutely pointed needles, which are very deliquescent. The aurochloride forms a yellow precipitate. The platinochloride, which is rather soluble and alters rapidly in warm aqueous solution, crystallizes in microscopically barbed needles. The salts of morrhuine are not precipitated by mercuric chloride, but are by the double iodide of mercury and potassium. Morrhuine is a powerful stimulant of the functions of nutrition and assimilation; it produces a rapid circulation of the extractive residues of cell life towards the blood and the kidneys, where they are eliminated, provoking in this way indirectly a powerful movement of assimilation correlative of the losses consequent upon the inverse movement of de-assimilation. This is considered to have been demonstrated by the superexcitation of appetite in animals brought under its influence.

As before stated, a portion of the bases just described is combined in the oil under the form of lecithines. It is impossible, in fact, to concentrate an alcoholic extract made in presence of a mineral acid, although dilute, without the gradual deposition in the cold of a viscous acid to

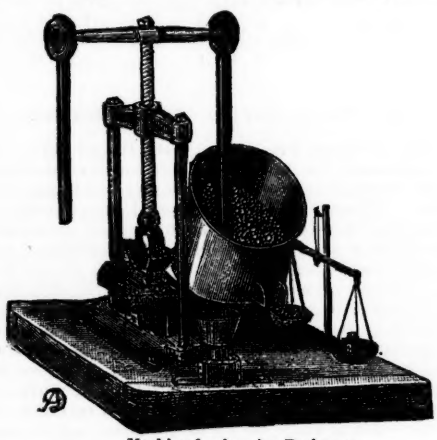
which the bases were originally joined; at the same time phosphoglyceric acid makes its appearance. The lecithines do not exist in the white or slightly colored oils; neither do the alkaloids, which is considered to be another proof that these bases occur under the form of complex phosphoglyceric compounds.

. . . . . .

While the authors' results up to this point would indicate that the brown cod-liver oils are more active, medicinally, than the light-colored ones, yet the authors distinctly state that they do not consider the undeniable reparative action of the oil to be entirely due to the alkaloids and morrhuic acid. They believe that the oil acts, first, by its fatty bodies, which are eminently assimilable, owing to their slight acidity and partial saponification, the latter being due to the influence of hepatic ferments, and to the solution, in the oil, of a certain quantity of biliary matters which render emulsification easy, especially under the influence of the pancreatic juice. These fatty bodies are energetic reconstituents of the tissues through their richness in phosphates, phosphoglyceric acid, lecithines, and originally combined phosphorus, the phosphorus being presented to the system under the form in which it exists in milk, eggs, the brain, legumin, nuclein, etc. Secondly, bromine and iodine, which are present in the oil in minute quantity (0.03 to 0.04 Gm. of iodine per liter), doubtless contribute also to its reparative action. Lastly, cod-liver oil acts by the morrhuic acid it contains as well as by its bases, several of which excite the nervous system, accelerate nutrition, and correlatively augment the appetite.

A MACHINE FOR FORMING PACKAGES.

A MACHINE for forming uniform packages of powders, etc., is sometimes desirable, and the one here shown is said to be capable of delivering as many as 200 per



Machine for forming Packages.

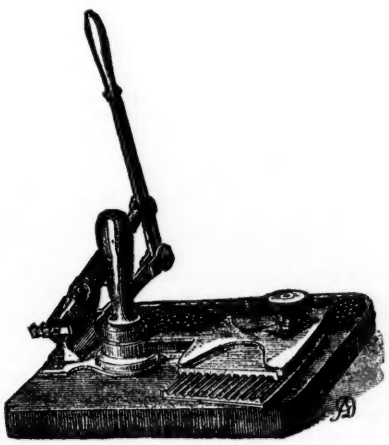
hour. The substance to be packed is first weighed (we would advise a platform scale instead of the clumsy beam scale shown in the figure) and then placed into a paper bag, made by folding the paper about a wooden block of the desired shape, and turning down one end in the usual manner to form a bottom to the package. The block is then removed and a metallic funnel inserted, and the two are placed in the matrix of the press. The substance to be packed is then poured in and the plunger forced down by means of the screw. The rods depending from the cross-bar serve as handles and to give the proper weight to the cross-bar to keep it turning when once set in motion. The rectangular funnel and matrix can be replaced by cylindrical or other shapes, if desired, one such being shown on the bed-piece of the press.

Estimation of Quinine in Quinine Tannate.

ON examining, by Orillard's method, some specimens of quinine tannate known to contain 25 to 30 per cent of the alkaloid, only about 7 to 13 per cent was found. This results partly from the imperfect extraction by alcohol of the quinine contained in the residue of the evaporation with lime, and partly from the solubility of the alkaloid in the potash employed to throw it down for weighing. The following method is proposed by S. Neumann for technical purposes; it gives results which are about 3 per cent above the truth. Two Gm. of the powdered tannate are well shaken in a stoppered cylinder with 20 to 25 C.c. of aqueous potash of spec. grav. 1.24. Care must be taken that the tannate does not adhere to the glass. Water is then added to make up to 60 to 80 C.c., and then 100 C.c. of ether, accurately measured. The cylinder is immediately closed and vigorously shaken. When the two liquids have been separated there must be no solid particles visible in either layer; 50 C.c. of the ethereal layer are taken out with a pipette and evaporated in a weighed beaker, the quinine being finally dried at 100° and weighed. An estimation can be completed in one and one-half hours.—*Zeit. anal. Chem.* and *J. Chem. Soc.*

NEGRE'S PILL MACHINE.

A COMPACT pill-making machine, which may be used for dispensing, is shown in the adjoining illustration. On the left is seen a cylinder into which the mass is placed, and then by means of a lever the piston is made to force the mass through a hole in a piece of metal, and thus form what is known as a "pipe." There must needs be several of these formers, with holes of different sizes. The pipe is then transferred to the cutter on the right, which resembles the pill machine in ordinary use, excepting that its grooves are segments of a circle. At the further side of the bed of the machine is a depression serving as a receptacle for the completed pills. The machine is made by H. Nègre & Co., 57 Avenue du Maine, Paris.



Nègre's Pill Machine.

Colors, Hues, Tints, and Shades.

THERE are but three primary colors generally recognized—blue, red, and yellow. These are called primary because they cannot be produced by compounding any other colors. Then we have the secondaries—green, purple, and orange. These are called secondaries because blue and yellow make green; red and blue, purple; red and yellow, orange. From these we derive the tertiaries—olive, citrine, and russet. Purple and green make olive; orange and green, citrine; purple and orange, russet. Thus we have the three classifications denoting all the colors proper extant. From these are derived the hues, tints, and shades. A hue is obtained from a combination of any of the primaries. The hue may vary according to the predominating influence of one color over another. To obtain a "tint" we simply add white to any of these colors; and to form a "shade" we add black or any of the dark colors.

So from the above we have the alphabet of colors. The varieties of tones, tints, hues, or shades to be obtained from this alphabet are as kaleidoscopic in their possibilities as the alphabet of letters. The hand of man or the skill of the artist will never exhaust them.

We have still another term we use in relation to colors, which bears its own significance also, and that is "tone." While we have our three primaries to start from, yet we have no standard "tone" from which we shall start our secondaries. There are many different kinds of red, yellow, and blue, and we signify the difference as "tones," the same as we apply the term to different instruments of the same kind. You will say that this piano has a much better tone than that piano. So we will find in selecting our primaries. While some of the "high-toned" reds will produce a much more beautiful tint, yet they are too fugitive to use for exterior house-painting; so, too, with the greens and yellows, while some are quite permanent. —S. PARIS DAVIS (abstract) in *N. W. Builder* (and *Scient. Amer.*)

The Chemical Relationship of Cocaine and Atropine.—Alfred Einhorn has succeeded in converting *anhydroecgonine*—a derivative of ecgonine, which itself is a decomposition product of cocaine—into *tropidine*, a derivative of tropine, the decomposition product of atropine. The conversion of the former into the latter takes place under elimination of carbonic anhydride (CO_2). Einhorn believes that the conversion of cocaine into atropine will probably be accomplished in a comparatively short time. The only step still wanting is the conversion of tropidine into tropine, the only problem being to find a method of adding the elements of water to the unsaturated affinities of the tropidine nucleus.—After *Berichte*, 1890, 1338.

India-Rubber.

In these days, when local horticultural societies are formed in almost every provincial town, and when botanical and horticultural novelties attract so much attention from scientists on the one hand and cultivators on the other, the practical value of the combined efforts of both seem likely to be lost sight of. The interest attached to the successful growth or to the flowering of a rare plant, like the Amorphophallus at Kew last year, is equally divided between the scientific botanist and the practical horticulturist, but the introduction and successful cultivation of some valuable economic plant in countries very far distant from its native home does not secure half so much popular attention, though the benefits accruing from it to the world at large are infinitely greater and of a more lasting character. What is the production of a double flower where a single one was known before only to exist, or even the introduction to our stoves of such plants as the *Victoria regia* and the *Amorphophallus titanum*, or, if possible, the *Rafflesia* and *Welwitschia*, to the establishment in India of the cinchona plant, which has been the means of bringing that most important medicine, quinine, within the reach of all?

The result of this successful enterprise will always stand as a monument of the union of science with practice, and one of the benefits to the world in which Kew has played so large a part.

Next to this achievement, the introduction of rubber-producing plants into the various possessions of the British Empire is undoubtedly of the greatest importance. Though the whole history of these experiments has been given in the reports of the Royal Gardens, Kew, ranging between the years 1873 and 1882, it may be of some interest to point out that whereas some twenty years ago india-rubber, or caoutchouc, was known to be produced only from *Hevea braziliensis*, then known as *Siphonia elastica*, from Pará, and from *Ficus elastica*, from Assam, the researches of the authorities at Kew have since shown that the rubber of commerce is drawn from several different plants, belonging to the natural orders Euphorbiaceæ, Urticaceæ, and Apocynaceæ—the first-named family including the Pará sort, or Hevea rubber, which is still imported in large quantities, and holds its own as the best quality, though in its native forest the trees are said to be more and more difficult to get at, as the collectors have to penetrate further each year into the more inaccessible parts. The natural consequence of this is that more attention has been given to other sources, and another Euphorbiaceous plant, the growth of which has become considerably developed of late, and which yields the rubber known in commerce as Ceara scrap (*Manihot Glaziovii*), has been introduced into Ceylon and other countries, where it has grown rapidly. This, as its name implies, is a Brazilian species, and though the rubber has been known in trade for a long time, the plant yielding it was not known till about fourteen years ago, when a consignment of plants was received at Kew, propagated, and widely distributed to India and Ceylon. The success of the plants in these countries has been recorded and fully detailed in the Kew reports before referred to; as also that of another well-known source, namely, the *Castilloa elastica*, which furnishes the bulk of the rubber from Central America, such as that known in trade as Guatemala rubber.

Mr. Morris, in his little book on "The Colony of British Honduras," gives some interesting notes on this tree, and details as to the cultivation and the extraction and preparation of rubber from it. He says:

"The tree is very abundant in some places, although daily becoming scarcer in the immediate neighborhood of settlements. It grows to the height of about forty or fifty feet, has a thick, clean stem about two feet in diameter at the base, and in habit of growth much resembles a bread-fruit tree, to which, indeed, it is closely allied. . . . The Castilloa rubber tree is fit to be tapped for caoutchouc, or the elastic, gummy substance produced by its milk, when about seven to ten years old. The milk is obtained at present from trees growing wild, by men called rubber gatherers, who are well acquainted with all the localities inhabited by the Toonu (under which name the plant is known in Honduras). The proper season for tapping the trees is after the autumn rains, which occur some months after the trees have ripened their fruit, and before they put forth buds for the next season. The flow of milk is most copious during the months of October, November, December, and January. The rubber gatherers commence operations on an untapped tree by reaching with a ladder, or by means of lianes or tic-tics, the upper portions of its trunk, and scoring the bark the whole length with deep cuts which extend all round. The cuts are sometimes made so as to form a series of spirals all round the tree; at other times they are shaped simply like the letter V, with a small piece of hoop iron, the blade of a cutlass, or the leaf of a palm placed in the lower angle to form a spout to lead the milk into a receptacle below. A number of trees are treated in this manner, and left to bleed for several hours. At the close of the day the rubber gatherer collects all the milk, washes it by means of water, and leaves it standing until the next morning. He now procures a quantity of the stem of the moon plant (*Calonyction speciosum*), pounds it into a mass, and throws it into a bucket of water. After this decoction has been strained, it is added to the rubber milk in the proportion of one pint to a gallon, or until after brisk stirring the whole of the milk is coagulated. The masses of rubber floating on the surface are now strained from the liquid, kneaded into cakes, and placed under heavy weights to get rid of all watery particles. When perfectly drained and dry, the rubber cakes are fit for the market, and exported generally in casks.

"A large tree of Castilloa, say two feet in diameter, will yield eight gallons of milk when first cut; each gallon of milk, in the proper season, will make about two pounds of rubber. Hence a tree of this size will give a return of sixteen pounds of rubber, of the value of $10."

Mr. Morris further refers to the use of Castilloa as a shade-giving tree in connection with the cultivation of bananas, cacao, Liberian coffee, oranges, etc., and records the fact that at the time he wrote, in 1883, the cacao planters in Trinidad were gradually discarding their recognized shade tree, the *Erythrina umbrosa*, and adopting others more suitable and more profitable, none of which, however, could compare with the Castilloa, "either in quickness of growth, in shade-giving properties, or in the return which it is likely to give the planter year after year if properly treated."

It will be sufficient to say that the plants already referred to are the principal sources of the American rubber of commerce. Quantities, however, come from India and from other parts of the East, the former from *Ficus elastica*, and the latter from various plants belonging to the Apocynaceæ, being species of Willoughbeia, Lobonotis, and Chilocarpus; while on the east and west coasts of Africa several species of Landolphia yield rubber of excellent quality. A detailed account of these species, and of their distribution into various parts of the world, is given in the Kew reports before alluded to, and it forms one of the most valuable and interesting records of work done at Kew.—J. R. J. in the *Gard. Chron.*

The Future Supply of India-Rubber.

Recent political proceedings in Brazil have brought into prominence the subject of our india-rubber imports, on which depends the success of one of our important industries. A failure in the supply of Pará rubber, whether caused by recklessly dealing with laws of exportation or natural laws in the forest, would fall heavily on many of our public and private interests. Hence it will be of interest to refer to what has been done [in England] by way of providing against any such contingency. Considering that india-rubber comes next after sugar and coffee on the list of Brazilian exports, it appears strange that till recently so little attention was given to the way in which the substance was collected. The work was left to ignorant natives, and they destroyed millions of trees either by cutting them down or by their injudicious system of tapping. Latterly, however, the province of Amazonas has passed laws to regulate the season for tapping the trees, and has awarded premiums to encourage the planting of new forests.

Some twenty years ago the importance of the question of the future supply of rubber was recognized by our government, and Mr. James Collins, of Edinburgh, was instructed by the India Office to draw up a report concerning the rubber trees of America, and to ascertain whether they could be grown in India. The results of his investigations were published in 1872. In 1875 Mr. Robert Cross, of Liverpool, in concert with Mr. C. R., Markham, of Assam, went to Panama to collect seeds and cuttings of the Central American rubber tree (Castilloa). He was also sent by the India Office in the following year to Pará to collect information about the Pará (Hevea) and Ceara (Manihot) trees, which produce the best rubber. The descriptions given in his official report show that he met with formidable difficulties in the course of his undertakings, but he succeeded in his main object. The seeds and cuttings which he obtained were duly sown and planted at Kew, and in due time dispersed over various botanical gardens in India and the Colonies. As trees, they are now flourishing at Madras, Calcutta, and Zanzibar, also in Burmah and Ceylon. The great superiority of the Pará rubber (Hevea) over all other kinds has insured for it the most attention, but, notably in Assam and Northern India, its cultivation has been very much of a failure, though not equally so in Burmah and Ceylon. It requires an equable, moist climate without extremes of temperature. The Castilloa tree was reported a few years ago to be doing well in Burliar and other places in Southern India. Some attempts have been made to grow the West African tree (Landolphia) in India. It is a hardy shrub, but takes up a good deal of room, and the quality of its products leads to some doubt whether it would pay for cultivation. From the botanical point of view we append, on the following page, a short list of plants producing india-rubber.

The trees in this list are to be met with in a broad zone parallel to the equator, where there is an isotherm of 70° F. Rubber is found as a milky fluid in the laticife-

NAT. ORDER.	GENUS.	SPECIES.	LOCALITY.
EUPHORBIACEÆ..	HEVEA.	*H. Braziliensis*..	Pará.
	MANIHOT..	*M. Glaziovii*	Ceara.
ARTOCARPACEÆ..	CASTILLOA.....	*C. Elastica*.....	Central America, West Indies.
	FICUS..... ..	*F. Elastica*.....	Assam, Rangoon, Java.
APOCYNACEÆ.....	HANCORNIA.....	*H. Speciosa*.....	Pernambuco.
	URCEOLA.	*U. Elastica*.. ...	Borneo.
	VAHEA.....	*V. Gummifera*..	Madagascar.
	LANDOLPHIA...	*Various*.....	West Africa, Mozambique.

rous vessels in the middle layer of the bark. It is coagulated by one of various methods, which include smoking over a wood fire, as in Brazil, or adding alum or a dilute acid, or by pouring the milky substance into hot water. The milk is very rarely met with in England, but we recently examined a good sample from Pará, and the proportion of rubber found in it—namely, 32 per cent—was found to agree closely with earlier analyses by Adriani and Faraday. Before bottling the milk it is necessary to add some ammonia to prevent spontaneous coagulation. The most substance comes from the lower limbs of the Pará tree, which grows to great dimensions, and may be tapped at ten years' growth, but does not for twenty years reach its maturity.

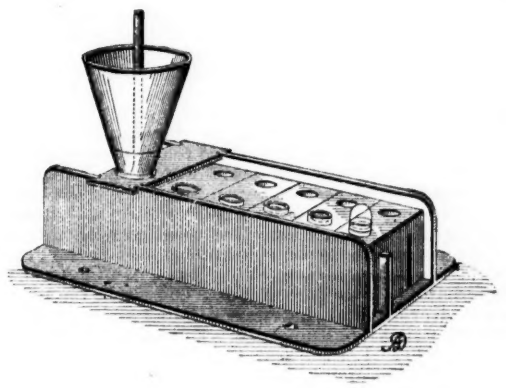
From trees as they grow in untended nature, we may turn to some of the results that have been obtained from those that have been acclimatized. A report in 1881, from Dr. King, of the Calcutta Botanical Gardens, stated that the Ceara tree was the only one that promised good results, while the Pará and the Madagascar had utterly failed. This experience has been confirmed by Sir John Kirk, consul at Zanzibar, who, in one of his official reports in 1882, said that the Ceara (Manihot) plants grew very well even in the worst soil, that they needed no attention, and that they commenced to yield rubber in five years, though not in a way to be remunerative. Nevertheless, the attempt to acclimatize American plants in Africa is an interesting one, and we cannot help wishing it an improved success, as manufacturers would be glad to receive clean rubber from Africa in place of the dirty resinous product of the Landolphias so generally imported into this country. In October, 1882, Dr. Trimen, of the Ceylon Botanical Gardens at Peradenya, sent to Kew a sample of the Central American rubber (Castilloa) produced from a cutting sent from Kew in 1876. This was examined by an expert, and reported to be of good quality, only deficient in tensile strength, owing, perhaps, to the immaturity of the tree from which it was taken. Colonial rubber is often being received at Kew, and submitted for examination, showing that this branch of economic botany is far from being neglected. Of Pará rubber from a Kew cutting, grown at Mergui, the first sample was received last season at Kew, and through the courtesy of Mr. Morris, the sub-director, we got a piece for examination. As in the above case, it was found wanting in tensile strength, and fell short of the best qualities of ordinary smoked Pará. The question is whether the excess of its viscous over its fibrous constituents will be corrected in future tappings. It is not only in acclimatizing foreign trees in India that work has been done, but, acting on Mr. Collins' report, the India Office has caused denuded districts to be replanted with the indigenous *Ficus elastica*. Already in 1870 there was a plantation of these trees at Chardnar, in the district of Darrang, which covered a space of eighty square miles. This particular area has since been annually increased, and there has been planting in other districts besides. We may feel assured that the wanton destruction of rubber trees has practically ceased, and that the importance of securing an adequate supply of rubber for our future needs is fully recognized.

The financial side of the question can hardly be discussed till more reliable data have come to hand, but they are hardly likely to prove that undertakings in forestry bring any immediate or very early return. Dr. Trimen, for his part, feels confident that produce from Ceara trees will furnish an important item of revenue to Ceylon. It must be added that, in view of the competition in the case, other interested parties are not so sanguine of commercial success as he is.—*Industries.*

The British Unofficinal Formulary.—The recent additions made by the committee appointed by the British Pharmaceutical Conference number but nine: Acidum hydrocyanicum (Scheele), A. hypophosphoricum, Chloroformum Aconiti, Chloroformum Belladonnæ, Chloroformum camphoratum, Elixir Sennæ, Extractum Hæmatoxyli liquidum, Syrupus Calcii Hypophosphitis, Syrupus Sodii Hypophosphitis. The first is calculated to insure greater uniformity in strength than the Scheele's acid of commerce is credited with. The formula for hypophosphorous acid is introduced on account of the differences in products of the best makers. Of the three chloroform formulæ, the third is a simple solution, and in the other the solvent action is assisted by strong solution of ammonia.—*Lancet.*

A CAPSULE FILLER.

An apparatus devised for facilitating the filling of empty capsules is made by the Acme Capsule-Filler Company, of Washington, D. C. The *Druggists' Bulletin*, from which we take our illustration, does not afford a very lucid description of the machine, but, so far as we can comprehend, it seems to consist of a metallic base, with a cross-bar supporting a funnel. Through the length of the machine passes a wooden portion, made with openings into which fit the various sizes of capsules in the market; there being several of the wooden slides with each machine. Running lengthwise is also a metallic strip, the upper edge of which is curved, so that as the wooden slide is moved towards the funnel the capsules are made to rise from the slide sufficiently to receive the cap. To operate it, a slide adapted for the size of capsules to be filled is charged with empty shells, the covers being removed. The slide is then put into place and pushed along until the first hole comes under the funnel (as indicated by the groove in the upper surface of the slide coming even with the outer margin of the funnel support). The funnel is then screwed down until it fits the top of the slide but still allows it to move. The powder is then placed in the funnel, and if necessary packed into the capsule with a rammer. As the capsule first filled arrives at the position shown in the illustration, it is capped and lifted from the slide, and the slide is moved again from left to right until all the capsules have been capped and removed.



"Acme" Capsule Filler.

Kaolin and its Source.

Kaolin, which is so useful an article, even in pharmacy, as an insoluble and inert substance suitable as filtering material, or in making pills of permanganate or other oxidizing agents, is a silicate of aluminium. In some places it occurs almost in a pure state. But generally it is found in combination with other products of the decomposition of granite. How the latter has become decomposed is not known, but it is supposed to be due to atmospheric influences. An important kaolin mine exists in the southern part of the Department de l'Allier (France), where a fine-grained granite has, over a large area, been changed to a mixture of silica, alkaline silicates, and silicate of aluminium, all derived from the felspar of the granite. This deposit is worked on a large scale, the only agent used for separating the constituents being water, which is made to pass, mixed with the mined material, through a series of vats, channels, and sluices, in which the coarser and heavier particles are successively deposited, while the finer kaolin remains suspended in the water and is finally deposited in large tanks. When thoroughly washed and dried it is ready for shipment, being chiefly used in the manufacture of porcelain, ultramarin, and paper.

Even the best kaolin is not absolutely white, but has a more or less faint yellowish tint. This is overcome by mixing with the last water a very small quantity of methylene blue or Lauth's violet, which destroys the yellow tint.—After *Zeitsch. f. angew. Chem.*

Biblical units have the following equivalents: A shekel of gold was $8. A firkin was seven pints. A talent of gold was $13,809. A talent of silver was $538.30. Ezekiel's reed was nearly 11 feet. A cubit was nearly 22 inches. A bin was 1 gallon and 2 pints. A mite was less than a quarter of a glass. A shekel of silver was about 50 cents. A piece of silver, or a penny, was 12 cents. A Sabbath day's journey was about an English mile. An ephah, or bath, contained 7 gallons and 5 pints. A day's journey was about 23$_8$ miles. A hand's breadth was equal to 3$\frac{3}{4}$ inches. A finger's breadth was equal to 1 inch. A farthing was 7 cents.

Asafœtida in Tears.

THE peddling character of the drug trade, as compared with other branches of the produce business, is a matter of frequent comment. It is, however, precisely from this characteristic that the drug business derives an amount of interest which must be totally lacking in transactions in such large articles as coffee, sugar, or tea, and which frequently causes an apparently inordinate amount of time to be devoted to consignments of goods of comparatively insignificant intrinsic value. Such a parcel of merchandise, imported from Bombay, was offered at last week's drug auctions. The whole of it weighed less than a ton, and the price which it realized was rather below £50, yet no other lot in the sale was watched with greater curiosity. The parcel to which we refer consisted of eight cases of a drug which the importers believed to be gum ammoniacum, while the dock authorities had cleared it under the name of asafœtida, and which the selling broker, to be quite safe, sold as "gum" pure and simple. Among the audience opinions were divided, but most of those who expressed themselves gave it as their belief that the article consisted of a mixture of asafœtida and ammoniacum, with a large proportion of seeds of the latter drug. Ultimately the lots were disposed of to three or four buyers, who, we should think, will have no reason to regret their bargain. A careful examination of a sample which we secured showed that the parcel consisted entirely of genuine asafœtida of the finest description, intermixed with an unusually small proportion of such earthy impurities and seed as would unavoidably be collected along with the gum-resin itself. The sample examined by us showed loose tears of irregular shape, varying in size from a pea to a large walnut, of a pale orange to light brown color, and rather less pronounced odor than that of the asafœtida usually met with in the market. Fractured, the tears showed the usual characteristics of fine asafœtida, the surface being opaque and of a milk-white color, while the taste proved all that it should be—viz., acrid and alliaceous in the highest degree. It was observed that the fractured tears when exposed to the air did not redden so quickly or so deeply as does the usual commercial asafœtida, and in one respect the drug did not answer to the orthodox requirements, inasmuch as the freshly fractured surface touched with nitric acid did not assume the green color mentioned in the Pharmacopœia as a characteristic of the tears. In fact no coloration whatever was perceptible. The seeds found in the sample were round, hairy, and had two or three vittæ only extending longitudinally. The hairiness of the seeds at once disposed of the assertion that they were seeds of *Dorema Ammoniacum*. Neither were they the seeds of the *Ferula Narthex*, for the latter are oblong and possess at least four vittæ. They belong, in fact, to *Ferula fœtida*, one of the plants from which the asafœtida of commerce is derived. A considerable amount of confusion has always prevailed with regard to the exact botanical origin of asafœtida, and although the researches of some recent travellers—notably Dr. J. E. Aitchison, who, a few years ago, as a member of the Afghan Frontier Commission, traversed a great part of the region producing the drug—have helped to shed a good deal of light on the subject, much remains to be cleared up. According to Mr. E. M. Holmes, who ascertained the botanical source of the sample here referred to, the asafœtida plants may be divided into two groups, the first and most important of which includes the three varieties which yield the bulk of the gum-resin met with in commerce—viz.: *Ferula Narthex*, Boiss. (syn.: *Narthex Asafœtida*, Falc.); *F. fœtida* (syn.: *Scorodosma fœtidum*); and *F. fœtidissima*, Regel and Schmalh. The second group comprises the *F. alliacea*, Boiss., which is believed by Dr. Dymock to be the source of the dark-colored "hing" largely used as a condiment throughout India and the adjacent countries, but never met with in European commerce.

The asafœtida region is thought to include not only the whole of Southern and Eastern Persia, but also the greater part of Beloochistan and Afghanistan, Turkestan, and the region, now under Russian control, eastward of the Sea of Aral. It is, we believe, cultivated in the Punjab also, and the bulk of it, at any rate, is brought into commerce via Bombay, where it is received either by way of the Persian Gulf or through British India. The proportion of the drug consumed in the East is enormously larger than that shipped to Western countries. We find, from the statistical tables of the trade of British India which have just been issued, that whereas the total imports of asafœtida into that country during the last five years have been 37,306 cwt., the aggregate exports have only been 2,014 cwt., or barely 5 per cent of the whole. The first trustworthy account of the collection of asafœtida in Persia was given about two hundred years ago by one Engelbert Kaempfer, a German scientist; but, from the reports of recent visitors who have observed the mode of collection of the drug, this still remains the same in all essential particulars as in Kaempfer's time. According to that authority the collection begins about the middle of April, when the earth is removed from the roots, which vary in thickness from a carrot to that of a man's leg, and the leaves of the plant are removed. Toward the end of May the top of the root is sliced away, and the juice exudes and is scraped off. A few days later another incision is made, and this process is repeated at intervals until the beginning of July, when the crop is at an end. It has been asserted that the usual asafœtida of commerce in the agglutinated tears is that which exudes from the root when the whole top is sliced off, while the tears are the solidified juice obtained from incisions only. It has also been suggested that the agglutinated tears were the product of a different variety of the plant than that which yielded the free drops. However this may be, it is certain that the loose tear of asafœtida is very rarely met with in our markets. Some few years ago a small parcel of what was believed to be tear asafœtida was offered at the London drug auctions, and sold with some competition at about 50*s.* per cwt. The tears, which were round or oval in shape, and about one and one-half inches in diameter, proved to be pebbles of talc which had been coated with true drug, probably by dipping them in liquid asafœtida. The amount of true asafœtida was not over 5 per cent. Whether the fraud was practised by the same expert hands which sent us the spurious benzoin referred to in our last issue we cannot say; certain it is that both parcels came to us from Bombay.—*Chem. and Drugg.*

Naphtalin and its Tests.*

NAPHTALIN appears in form of white crystalline laminæ, of a tarry odor, of spec. grav. 1.15, melting at 80° C., and boiling at 217° C. It sublimes easily. In water it is almost insoluble; easily soluble in alcohol, benzol, toluol, and ether; only slightly in ligroin; 100 parts of absolute alcohol, at 15° C., dissolve 5.29 parts of naphtalin; 100 parts of toluol, at 16.4° C., dissolve 31.94 parts. When boiled with water, it is carried over by the steam.

When oxidized by diluted nitric acid (spec. grav. 1.13), naphtalin yields phtalic acid (about 40 per cent of the theoretical quantity). With chromic and glacial acetic acid it yields alpha-naphtochinon; with chromium chloride it yields dichlornaphtochinon. When oxidized with manganic oxide and sulphuric acid, it furnishes dinaphtyl and phtalic acid.

Treatment with fuming nitric, or with a mixture of concentrated nitric and sulphuric acids, converts it into nitro-substitution products.

Chlorine made to act upon it produces both addition and substitution products, but bromine only substitution products.

Concentrated sulphuric acid converts naphtalin into mono- or disulphonic acids or into sulphones, the effect depending upon the quantity or concentration of the acid, or upon the temperature.

On stirring for some time a mixture of naphtalin and about 20 parts of fuming nitric acid, washing the resulting nitro-product, and then transferring it to a boiling aqueous solution of equal parts of potassa (KHO) and potassium sulphide, the liquid gradually acquires a handsome violet-blue color (Vohl).

Some nitro-compounds combine with naphtalin, forming needle-shaped crystals.

The following *tests* may be applied to determine the purity of commercial naphtalin:

It should be white, and not become dark colored when brought in contact with concentrated sulphuric acid. Melted naphtalin should congeal at 80° C. It should boil at 217° C., leave no residue on heating, and should prove to be free from phenols and chinoline bases.

Phenols are detected as follows: Boil 1 or 2 Gm. of the naphtalin with 30 C.c. of a dilute soda solution, allow to cool, filter from the remaining naphtalin, and add to the filtrate some bromine water and hydrochloric acid. If phenols are present, a turbidity or (if a considerable amount is present) a precipitate of bromo-phenols will make its appearance.

Chinoline bases are detected by dissolving the naphtalin in concentrated sulphuric acid, pouring the solution into water, filtering, rendering the filtrate alkaline, and distilling. The chinoline bases pass over with the steam, and may be recognized by their odor.

If about 1.5 Gm. of antimony trichloride is heated a little beyond its melting point in a small porcelain crucible, and a little crude naphtalin put upon the inner edge of the crucible, carmine streaks will appear where the melted masses run together. Chemically pure naphtalin produces no such colored streaks. On cooling, shining, rhombic plates are formed. Anthracene and phenanthrene, under the same circumstances, yield a faintly greenish tint.

On dissolving naphtalin in chloroform, adding aluminium chloride, and warming, the liquid turns greenish-blue. This tint appears immediately only when the aluminium chloride was absolutely dry. If the least trace of moisture is present, the tint does not appear until after about half an hour.

Lysol is a new rival to creolin and carbolic acid in the disinfectant line. It is of the consistence of soft soap, and is made from coal tar, with fatty and resin soaps. It does not contain phenol.—*Chem. and Drugg.*

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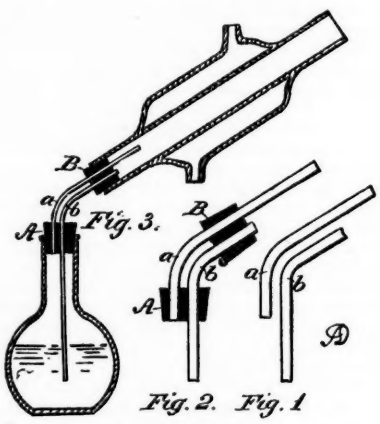
* Chiefly after G. Vortmann, "Anleitung zur Chem. Analyse Organischer Stoffe." 8vo. Leipzig and Wien, 1889.

A CONVENIENT ATTACHMENT FOR A REVERSED CONDENSER.

J. L. BEESON describes the improved attachment, here illustrated, in the *Scient. Amer. Suppl.* No. 754:

In using a reverse condenser, where considerable quantities of gas must pass out from the upper end of the condenser—as in the case of the preparation of monochloracetic acid by passing chlorine gas through boiling acetic acid, when considerable quantities of HCl and chlorine gases escape—if the heat is not very carefully regulated it often occurs that the flow of the condensed liquid is obstructed by passage of the gases and vapor into the condenser, and it accumulates until the tension of the vapor in the flask and the exit of the gases spurt it out. The following device I find to entirely prevent the trouble. It will be found to work to great advantage with a reversed condenser where no gases are escaping, as the heat will need no adjustment, and the operation, when started, will need no attention whatever.

Bend two small glass tubes as represented in *a* and *b*, Fig. 1. Pass these through the large rubber stopper, B, for flask, and the small one, A, for end of condenser, as represented in Fig. 2. Let *b* pass just through A, but far enough through B to reach below the surface of liquid in the flask. Let *a* pass just through B, but far enough through A to reach within an inch of where the water bath begins, as represented in Fig. 3. Tube *a* must not touch the condensing tube, especially on the bottom, as the condensed liquid would flow back into it.



Beeson's Condenser.

The hot vapor and gases will pass out through *a*, since *b* dips below the surface of the liquid, and will condense above the end of *a*, as it does not reach the water bath in the condenser, and will flow back through *b* into the flask. The lower part of the condenser will not become cool enough to condense the outflowing vapor in *a*, nor hot enough to vaporize the backflowing condensed liquid; so we have a steady stream of vapor, or vapor and gas, flowing out through *a*, and a steady stream of condensed liquid flowing back into the flask through *b*.

A NEW AND IMPROVED EXTRACTION APPARATUS.

RECENT fat determinations which required to be made in the shortest possible time and with reliable results, have given me an opportunity to test the apparatus here described.

The extractors hitherto in use did not answer my purpose, being either too complicated or requiring a long time for completing the extraction. The chief advantage of the new apparatus (Kenther's) is this, that it yields equally good results in one-fourth the time required by other extractors. A very convenient feature also is a stopcock attached to the apparatus, by means of which the progress of extraction may at any moment be tested, while a simple turn of the same stopcock, when the extraction is completed, will enable the operator to distil off the volatile menstruum from the flask. The apparatus may be used for every kind of extraction—fat, oil, powder, etc.—with equally good results.

The apparatus consists of an extractor proper, A, which is intended to receive the substance to be extracted, either directly or by means of a funnel, cartridge, or weighing-glass, G, the perforated bottom of which is covered with filtering paper, upon which is then placed any suitable quantity of the substance.

The liquid which percolates through the substance runs off through B. C is a siphon tube provided with a stopcock, D. E is a tube conveying the hot vapor. F is a filter lining, which may consist of linen, filtering paper, felt, cotton, or other porous material.

When the apparatus is to be used, the following method is the best:

First weigh the extraction flask, then pour into it the requisite amount of alcohol (or ether, or other volatile liquid), connect the flask with the extractor, cautiously introduce into the latter the substance to be extracted, which has been carefully weighed, connect the apparatus with the condenser, fasten the apparatus to a holder, and place below it a water bath with burner.

If it is now desired to ascertain how much time is required for exhausting a certain quantity, the stopcock attached to the siphon tube is opened, a drop of the liquid received upon platinum foil or a watch glass, and notice taken whether there is any residue.

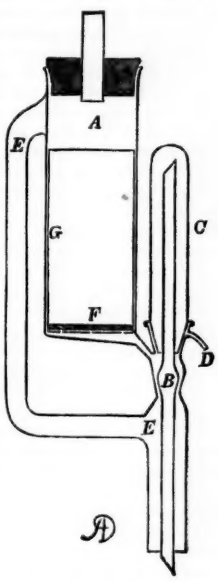
When the apparatus is put together, care should be taken to adjust the tube C in such a manner that the orifice in it is not too far from the outlet, so that only a slight rotation will be required to open or shut the outlet.

When the extraction is completed, the stopcock is opened, and the alcohol, ether, etc., received in a separate flask. Of course, when the stopcock is opened the extraction is interrupted, and the vaporized alcohol, etc., reaches the outlet pure. When the distillation is completed, the extraction flask is disconnected, carefully wiped off, put into a drying oven for a short time, then allowed to become cold in an exsiccator, and finally weighed. The employment of this apparatus saves much time and volatile menstruum, and yields very exact results. A complete determination of fat in milk, from the moment when the cartridge is placed in, to the last weighing of the flask, required only forty minutes.

It may be added that all parts are carefully fitted together by grinding.

W. MUELLER, *Apotheker.*

BRAUNSCHWEIG.



Mueller's Extractor.

Note on Manna.

FROM a paper on "Manna-yielding Plants," by J. R. Jackson, Curator of the Kew Museum, printed in the *Chem. and Drugg.* (June 28th), we take the following introductory portion.

What is generally understood by the term *Manna* is a sweet exudation from the stems of the manna ash (*Fraxinus Ornus*, L.), a small tree found in Italy, and extending into Switzerland, the Southern Tyrol, Hungary, Greece, Turkey, and other places. In England the tree is also grown for its ornamental character, but there it grows to a height of 30 feet or more. No manna is collected from the English-grown trees. It is from Sicily that the bulk of the manna of commerce is at the present time obtained, the plants being regularly cultivated in plantations in certain localities within twenty-five miles of Palermo on the west, and within fifty to seventy miles on the east. The trees, which are here planted in rows, grow to a height of from 10 to 20 feet, and are about 7 feet apart. A manna-ash plantation is kept free from weeds, the ground is loosened and is occasionally enriched with manure. At the age of eight years the stems have attained a diameter of about 3 inches, and the manna is then drawn from them by making incisions through the bark to the wood from 1 inch to 2 inches long, and at a distance from each other of about 1 inch. The first cut is made at the lower part of the trunk, and the next day another is made just above it, and this is continued daily during the dry weather, after which the tree is left alone until the following season, when the untouched part of the stem is operated upon in the same way, and similar practice is continued in succeeding years till the tree is exhausted, which is usually at the age of ten or twelve years, when the stem is cut off, and another shoots up from the same stump—indeed, several stems are often to be seen growing from the same root. The very finest manna is that which has become encrusted around pieces of stick or straws placed in the incisions in the stems to receive it; but the fine quality ordinarily seen in commerce, and known as flake manna, is that which has hardened on the stem. The inferior qualities are those which flow from the lower incision, and are either collected on tiles or in the hollow of boat-shaped joints of a species of *Opuntia*. After removal from the tree the manna is laid upon shelves to dry or harden before packing. The best manna harvests are obtained in warm, dry weather, usually in the months of July and August, when the trees have fully matured their leaves.

For Writing on Zinc a German chemist recommends Liq. antim. chlor. The zinc should first be treated with dilute sulphuric acid, and then write with an ordinary steel pen.

On the Formation of Hydrogen Peroxide from Ether.

AUTHORITIES have hitherto made very conflicting statements regarding the production of hydrogen peroxide (by some even supposed to be ozone) from ether, there being no definite knowledge as to the conditions under which it is produced. Prof. W. R. Dunstan and Mr. T. S. Dymond, who had partly investigated this subject before, have now made a new study of it, and have ascertained under what conditions the formation takes place. We give an abstract of their paper from the *Journ. Chem. Soc.*, 1890, 574.

The results of this second series of experiments now to be described leave no room for doubt that pure ether does not form hydrogen peroxide when exposed to light and air in presence either of water or of diluted sulphuric acid.

Three different specimens of ether were subjected to the action of daylight. They had been prepared and purified in the following manner:

Ether prepared by the reaction, under pressure, of excess of sodium ethoxide with ethyl iodide. The product was thoroughly washed with water, dried, and distilled.

Ether prepared by the reaction of alcohol and sulphuric acid, purchased as "pure ether," was further purified by agitating it successively with a small quantity of sulphuric acid, potash solution, and water. After having been dried over solid potash it was distilled.

Ether prepared from methylated spirit was purified in exactly the same manner as the previous specimen.

Of the three specimens thus prepared and purified, the first two did not in the least affect a 1-per-cent solution of potassium iodide or react with dilute chromic acid. The third specimen afforded a very pale yellow color with dilute potassium iodide, which was somewhat intensified by the addition of very dilute sulphuric acid; but it did not afford evidence of the slightest trace of hydrogen peroxide when tested with chromic acid.

We have ascertained the delicacy of the *characteristic reaction of hydrogen peroxide with chromic acid*, and have compared its delicacy with the potassium iodide reaction. Twenty C.c. of a solution containing 0.00125 Gm. of hydrogen peroxide in 100 C.c. of the liquid were mixed with a few drops of a dilute solution of chromic acid (prepared by the addition of dilute sulphuric acid to a 1-per-cent solution of potassium dichromate) and shaken with 20 C.c. of ether. The ether separated from the liquid of a pale-blue color, distinctly recognizable. With more dilute solutions the blue color was only indistinctly seen. The reaction is thus shown to be capable of revealing the presence of 0.00025 Gm. of hydrogen peroxide.

In testing ether for hydrogen peroxide, care has to be taken not to add a large excess of chromic acid, since this seriously impairs the delicacy of the reaction. One or two drops of the 1-per-cent solution of potassium dichromate, acidified with dilute sulphuric acid, should be added to about 20 C.c. of water, and the liquid shaken with about an equal volume of the ether. If the yellow color of the aqueous liquid disappears, a little more of the chromic acid must be added. It is important to observe that the *ethereal layer* which separates is blue, and *not merely the aqueous liquid*, since the presence in the ether of an easily oxidizable substance will lead to the reduction of the chromic acid and to the formation of a greenish-blue solution of a chromium salt. Twenty cubic centimeters of the solution in which the hydrogen peroxide had been recognized by the reaction with chromic acid were now mixed with an equal volume of ether and the same quantity of a 1-per-cent solution of potassium iodide. After a few seconds a pale-yellow color was observed, which deepened on the addition of dilute sulphuric acid. The chromic reaction for hydrogen peroxide is more satisfactory than that with potassium iodide, since it is instantaneous; a dilute neutral solution of hydrogen peroxide acts only very slowly on a solution of potassium iodide; and acidified potassium iodide, although it reacts more rapidly, cannot, under the present circumstances, be relied on as a test for hydrogen peroxide, since certain organic compounds are attacked by hydriodic acid. . . .

[The authors next exposed specimens of the three ethers for a long time both to daylight and to the electric light. The effect will be seen from the following.]

The ether prepared from ethyl iodide did not react with potassium iodide, hydriodic acid, or with chromic acid.

The ether prepared from methylated spirit contained an increased amount of hydrogen peroxide.

The ether prepared from alcohol and purified with sulphuric acid and potash reacted faintly with potassium iodide, and decidedly with hydriodic acid, but not with chromic acid. These three specimens had now been exposed to daylight for five months, and during two months to the electric light for three hours nightly, but no hydrogen peroxide had formed in those derived from ethyl iodide and from alcohol; that prepared from methylated spirit alone contained hydrogen peroxide. With respect to the other specially purified specimens, in no case had hydrogen peroxide been formed, neither had it formed in the acidulated water. It is therefore proved that the substance capable of yielding hydrogen peroxide may be removed from impure ether by the action either of hydriodic acid or of chromic acid. It is also proved that the addition of dilute sulphuric acid to pure ether does not promote the formation of hydrogen peroxide, and that this substance is not produced when oxygen and dilute sulphuric acid are exposed to light.

We consider that the results now recorded conclusively demonstrate that the hydrogen peroxide cannot be formed from purified ether by exposing it to light, under ordinary atmospheric conditions, in contact with air and water. The results recorded by former observers must have been due to the employment of impure ether. Since some of these observers appear to have worked with what is ordinarily known as "pure ether," which presumably is not prepared from methylated spirit, it would seem that occasionally ether prepared from alcohol, if not purified in the manner we have described, is liable to contain a substance which develops hydrogen peroxide.

We have not been able to ascertain the nature of this impurity, owing to the circumstance that it is present, together with other substances, in very small quantity. Of the impure specimens of ether we have examined, that which was richest in hydrogen peroxide had been exposed for many years to light. It contained only 0.04 per cent of hydrogen peroxide, as determined by its iodine-liberating power in acid solution.

Hydrogen Peroxide produced by the Slow Combustion of Ether.—It is well known that when ether is heated, with a limited supply of air, a pungent, highly irritating substance is produced which has been called "lampic acid." Legler (*Ber.*, 14, 602; *Annalen*, 217, 381) has investigated the nature of the products formed under these circumstances. He obtained, besides formic aldehyde and other compounds, a crystalline substance to which he assigned the formula $C_{11}H_{32}O_{21}$. It possesses oxidizing properties, but it is doubtful whether Legler actually obtained hydrogen peroxide from its decomposition, and apparently he did not find the substance among the products of the combustion. Perkins (Trans., 1882, 363) has drawn attention to the character of the flame which is observed when ether undergoes this change, and he mentions that aldehyde is formed, but no allusion is made to hydrogen peroxide.

In our first experiments on this point, air was drawn through pure ether slightly warmed, and the air charged with ether vapor was passed into a tube containing pumice heated to low redness. A lambent flame or glow was observed within the tube. The escaping vapors were condensed in cold water. This aqueous liquid, which possessed a highly pungent odor and taste, contained no hydrogen peroxide; it did not react either with potassium iodide or with chromic acid. Aldehyde and acetic acid were the chief products of the action. Other experiments were made with oxygen instead of air, and the same result was obtained. Further observations were made with a form of apparatus in which opportunity was afforded for the immediate condensation of any hydrogen peroxide that might be formed About 50 C.c. of pure ether were placed in a large flask, together with about the same quantity of water. A glass rod heated to low redness was repeatedly introduced into the upper part of the flask, so that it locally heated the air immediately above the liquid. The contents of the flask were agitated from time to time, so that any hydrogen peroxide that might be formed would be dissolved by the cold water. This process was continued until nearly the whole of the ether had disappeared. The remaining liquid *contained much hydrogen peroxide*, it liberated iodine from potassium iodide, and afforded a fine blue color with chromic acid. It was found that the most convenient form of apparatus for producing hydrogen peroxide by the slow combustion of ether consists of a modified (Döbereiner's) lamp, to which fresh supplies of air could be constantly admitted. A large flask, containing enough ether to cover the bottom and about an equal quantity of water, is connected with a wash bottle containing cold water. Through the cork of the flask there passes a wide tube, open at both ends, through which air is admitted, a spiral of stout platinum wire, and an elbow tube which is joined to the wash bottle. By means of an aspirator connected with this bottle, a current of air is drawn through the wide tube into the flask. The spirit is heated to redness and plunged into the flask, the current of air being so regulated that the platinum is maintained at a low red heat. From time to time the flask is shaken. Hydrogen peroxide is continuously formed, and when the ether has nearly disappeared a considerable quantity will be found in the remaining water, while some can be detected in the water of the wash bottle. In this process of oxidation, although the oxygen of the air is almost entirely consumed, little or no carbon dioxide is produced. The simplest interpretation of the change appears to be that the reaction is similar to that which occurs when ozone reacts with ether in presence of water. At a low red heat the ether forms a peroxidized product which is decomposed by water, with the production of hydrogen peroxide. It seems to be unnecessary to suppose that the atmospheric oxygen is actually ozonized before it peroxidizes the ether. The alternative hypothesis is that under the condition of the experiment water is directly oxidized, but there is no experimental justification for this view. We find that neither water nor dilute sulphuric acid forms hydrogen peroxide when heated with air in the manner above de-

scribed, and we have likewise failed to observe its formation during the evaporation of water in air.

We have not been able to form hydrogen peroxide by the slow combustion of acetone, alcohol, ethylene, or coal gas.

Summary.—Hydrogen peroxide is not formed when pure ether is exposed to light in contact with air, either in presence or absence of water.

Some specimens of ether, notably those prepared from methylated spirit, develop hydrogen peroxide when kept, unless they have been previously purified by repeated treatment with dilute chromic acid.

Ozone reacts with pure ether, and the product, when mixed with water, yields hydrogen peroxide.

The imperfect oxidation of pure ether effected by locally heating it in air leads, when water is present, to the production of hydrogen peroxide.

Hydrogen peroxide is not formed by the action of light on water and oxygen, even in presence of dilute sulphuric acid; neither is it produced under similar conditions when the oxygen or the water is heated.

Clove Culture in Zanzibar.

UNITED STATES CONSUL PRATT, of Zanzibar, writes as follows to the Department of State: Zanzibar is noted for being the principal source of the world's supply of cloves, and a report on the cultivation of this article of domestic economy may prove of interest.

When speaking of Zanzibar, we include the islands of Zanzibar and Pemba, three-fourths of the entire crop of cloves being produced in Pemba. Those grown on the island of Zanzibar are reckoned of superior quality and command the better price, but this is probably due to the fact that the owners reside here and can thus give their affairs the benefit of direct supervision. Certainly the conditions for their successful cultivation are most favorable at Pemba, where the rainfall exceeds that of Zanzibar; but the management being left to careless overseers, the result is the cloves being imperfectly cured and (but little care being observed in handling) are frequently marketed in an inferior condition.

The clove tree was first introduced into Zanzibar by the then sultan, Sayed Said bin Sultan, about the year 1830, since which time its cultivation has gradually extended, until now it is the chief industry of the islands. The industry received a check in 1872, the date of the great hurricane. At least nine-tenths of the trees were destroyed at that time, so the larger part of those now standing are of new growth. A peculiarity of the clove tree is that every part is aromatic, but the greatest strength is found in the bud, which is the "clove" of commerce. The finest quality of cloves is dark-brown in color, with full, perfect heads, free from moisture.

In the cultivation of the clove the first thing to be done is the starting of the shoot. The seeds are planted in long trenches and are kept well watered until after sprouting. In the course of forty days the shoots appear above ground. They are carefully watered and looked after for the space of two years, when they should be about three feet in height. They are then transplanted, being set about thirty feet apart, and are kept watered until they become well rooted. From this time on, the young trees require only ordinary care, though the best results are obtained when the ground about the trees is well worked over and kept free from weeds. The growth of the trees is very slow, and five or six years are required for it to come into bearing, at which time it is about the size of an ordinary pear tree and is usually very shapely. It is a pretty sight to see a young plantation just coming into bearing. The leaves, of various shades of green tinged with red, serve to set off the clusters of dull-red clove buds.

As soon as the buds are fully formed and assume this reddish color, the harvesting commences and is prosecuted for fully six months at intervals, since the buds do not form simultaneously, but at odd times throughout the said period. The limbs of the tree being very brittle, a peculiar four-sided ladder is brought into requisition, and the harvesting proceeds apace. As fast as collected the buds are spread out in the sun until they assume a brownish color, when they are put in the storehouse and are ready for market. A ten-year-old plantation should produce an average of twenty pounds of cloves to a tree. Trees of twenty years frequently produce upwards of one hundred pounds each.

The present season, commencing with July, 1889, is very favorable, and the crop will exceed that of any previous season. It will, in all probability, amount to 13,000,000 pounds, averaging a local value of ten cents per pound. The sultan derives no inconsiderable portion of his revenue from this source, since the duty is levied at 30 per cent *ad valorem*, thus placing to the sultan's credit for the present year nearly, if not quite, $400,000.

Besides the clove buds the stems are also gathered, and form an article of commerce, commanding about one-fifth the price of cloves and having about the same percentage of strength. To this circumstance is due the fact that ground cloves can be purchased in the home market at a lower price than whole cloves.

For the past fifteen years the cultivation of cloves has been the chief occupation of the Arab planters, and had always netted good returns. It seems probable that it will continue to be a profitable crop, since the consumption of the article appears to keep pace with the inevitable increase of production. Up to the present time the plantations have been worked with slave labor and at comparatively small expense; but with stoppage of slave supplies from the mainland great difficulty will be experienced by the planters during harvest time. One result will be an increase of expenses; but what the planters have most to fear is that the curtailment of the labor supply would entail a direct loss by rendering it impossible to harvest the crop until after it had blossomed, when it would be unfit for the uses of commerce.

The Manufacture of Anhydrous Sulphuric Acid.

ANHYDROUS sulphuric acid is now made on the manufacturing scale in the Malétra works at Quevilly (France) by Lunge's patent freezing process. The firm referred to holds the monopoly of the use of this process in France, and an account of the method of working it has been given by their chemists, Osterburger and Capelle.

The concentrated acid of commerce usually contains only 90 to 93 per cent of pure acid, and as stronger acid is now frequently required for manufacturing purposes, it has latterly been produced (up to 97 to 98 per cent) by concentration in platinum vessels, of which specimens were shown in Class 51 at the Paris Exhibition. It has now been found at the Malétra works that Lunge's freezing process can be satisfactorily carried out on the large scale. The commercial acid is first concentrated in platinum vessels, and it is advisable to bring it up to a strength of 96 to 97 per cent, for the mother liquors from the process are then found to contain as much as 94 to 95 per cent of H_2SO_4. The acid is then cooled and transferred to a reservoir standing at a higher level than the "filling apparatus." This is made of iron, and is divided by vertical partitions into a number of compartments, each connected to a cell of the cooling apparatus beneath. (Each cell contains about 12½ kilos of acid.) The cooling is effected by means of a solution of calcium chloride kept at a temperature of $-20°$ by an ice machine. In this solution are placed the iron cells.

In order to empty the cells containing the frozen acid, they are placed for a very short time in hot water, so as to loosen the crystals from the sides of the cells. The crystals are then separated from the strong mother liquor, and placed in an enamelled reservoir which is heated by steam or hot water. From this the melted acid is transferred directly to vessels suitable for transport.

No information is given respecting cost of manufacture. If this be not too high, the process should be of great value in preparing concentrated acid suitable for the manufacture of nitroglycerin and celluloid, for dissolving indigo, purifying mineral oils, etc.—*J. Soc. Chem. Ind.*

Action of the Soil on Pathogenic Germs.

THE *Bulletin of the Marine Hospital Bureau*, April 18th, contains the following note, translated from *La Rivista Internationale d'Igiene*, Naples, February, 1890:

"Pathogenic germs evidently exist in the soil. The bacilli of tetanus, typhus, and cholera have been observed, and it is probable that the bacillus of tuberculosis, the pneumococcus, will be found.

"The superficial strata of the earth are extremely rich in pathogenic germs; at a certain depth there is a limit beyond which the number of germs rapidly diminishes until they cease altogether.

"In the deep strata of the bacilliferous zone pathogenic species do not exist. Grancher and Deschamps have observed the arrest of the typhus bacillus at a depth of 50 Cm. In the cultivated superficial strata there are fewer micrococci than bacilli. The bacilli exist in the soil chiefly as spores. Under this form they best resist destructive agents, and may remain latent for years, retaining their virulence.

"It is probable that the pathogenic bacilli germinate in the soil.

"The cholera bacilli form numerous colonies, at a depth of 3 M. during the months from August to October; from April to June, at a depth of 2 M. there is no development, while at a depth of 1½ M. the bacillus vegetates. At least 2 per cent of humidity is necessary for the development of the germs. Soil rich in organic material is most favorable to this development.

"Causes of death of the pathogenic germs exist in the soil. The principal cause is exsiccation. Koch and Duclaux have demonstrated that this is especially hurtful to the micrococci, and here, according to Koch, is the explanation of the fact that micrococci are relatively rare on the superficies of the soil. The cholera bacillus dies rapidly under exsiccation. Netter fixes three weeks as the extreme limit at which the exsiccated pneumococcus preserves its virulence.

"The two most potent causes of destruction which the microbes encounter are the saprophytic [parasitic tubercular] bacilli and solar light.

"The saprophytic bacilli are in continual strife with the pathogenic microbes, and have generally the advantage. The bacillus of tetanus is exceptional, and may develop favorably in the presence of other species.

"Solar light is injurious to very many bacilli. According to Duclaux, it is the most universal means of sanitation, and the most economical and potent to which public or private hygiene can have recourse.

"The turning up of the soil liberates pathogenic germs, but when the soil is not disturbed for a long time a colossal germination frequently goes on. Exhumation frees the bacteria long latent in the soil; hence the epidemics that follow the turning up of the ground.

"Pathogenic germs leave the earth in many ways to attack men and animals. The soil which adheres to the body, to the feet of animals, and that which is carried by insects, disseminates pathogenic germs. Currents of air transport superficial dust, and so propagate the spores which resist exsiccation. Water also carries germs.

"Ordinarily, subterranean waters are on a level with the bacteriological zone. Sometimes this zone is exposed by fissures or by openings made in the earth. The walls of a well are a prolongation of the superficies, and are favorable to the life of the germs."—*Boston Med. and Surg. Jour.*

A New Reagent for Invert Sugar.

SOME fourteen years ago A. Soldaini proposed a substitute for Fehling's solution, viz., a solution of carbonate of copper in bicarbonate of potassium. It was, however, found that it could not easily be obtained of uniform composition, and that it acted too slowly upon invert sugar.

H. Ost has, however, succeeded in so modifying the composition that the resulting solution may be used with equal facility as Fehling's solution, while it has the additional advantage that the end of the reaction is recognized by the solution becoming entirely colorless. That is, the liquid in which the red cuprous oxide is suspended, or from which it is precipitated, is colorless. Moreover, the reagent remains unchanged on keeping, and it has scarcely any action upon cane sugar.

The following facts will explain the nature of the test solution proposed:

Carbonate of copper is abundantly soluble in a cold concentrated solution of potassium carbonate, forming a deep-blue liquid. There is produced an easily soluble double carbonate of copper and potassium, which can be obtained crystalline, in fine, blue needles. It contains more than half its weight of potassium carbonate. If the above-mentioned solution is heated and boiled, basic copper carbonate generally separates, or black cupric oxide. But if bicarbonate of potassium is present, the solution is no longer affected by boiling or evaporation. On the other hand, potassium bicarbonate alone is a very poor solvent of copper carbonate. Water precipitates copper carbonate from either solution, and this so much the easier the more copper and the less potassium carbonate they contain. The corresponding sodium salts are not as efficient solvents. The reagent devised by Ost is prepared by making the following solution:

Copper Sulphate, cryst.	23.5 Gm.
Potassium Carbonate	250.0 "
" Bicarbonate	100.0 "
Distilled Water	to make 1 0 liter.

Dissolve the potassium salts in about 860 C.c. of the water, and the copper salt in 100 C.c. Gradually add the latter to the former, and make up the volume with distilled water to 1 liter.

The analytical value of such a solution varies not only if the amount of copper salt is different, but also when the potassium salts vary in quantity. Hence the above-named proportions must be carefully observed. [It will be well to use the purest available potassium carbonate for this purpose, preferably Merck's "chem. pure" salt. As the solution ought not to be used without its titer having been actually tested upon a sugar solution of known strength, a little variation in the purity of the potassium salts will not make very much difference.]

The solution thus prepared may be used either for volumetric or for gravimetric analysis.

A. *Volumetric Determination of Sugar.*

Fifty C.c. of the test solution are completely decolorized by 25 C.c. of a 0.4-per-cent solution of pure invert sugar (that is, by 0.100 Gm. of this sugar) on boiling for nine or ten minutes.

An exactly 1-per-cent solution of invert sugar is prepared, according to Soxhlet, by heating 9.5 Gm. of *pure* cane sugar for half an hour with 700 Gm. of water and 100 C.c. of a one-fifth normal hydrochloric acid (containing 7.28 Gm. HCl in 1 liter), then neutralizing with soda, and making up the volume with water to 1 liter. [From this solution a 0.4-per-cent one may readily be prepared.]

The end of the reaction is easily recognized—sharply, at least, to 0.4 C.c.—by the disappearance of color, the liquid finally becoming colorless like water, not yellow as is the case with Fehling's solution.

If cane sugar is present a somewhat smaller quantity of the solution of invert sugar is required to decolorize the reagent. Supposing a solution containing 100 parts of cane sugar holds in solution the following additional number of parts of invert sugar, then the number of cubic centimeters of the reagent required will be those placed by the side of them in the following table:

Invert Sugar.	C.c. of Reagent.
100 and more parts	25 C.c.
20 parts	24.8 "
5 "	24.5 "
2 "	24.25 "

B. *Gravimetric Determination of Sugar.*

Fifty C.c. of the copper solution are mixed with a quantity of solution of invert sugar corresponding to not more than 0.100 Gm. of it, and the volume of the mixture made up with water to near 75 C.c. If not more than 0.050 Gm. and not less than 0.020 to 0.025 Gm. of the sugar is used, the boiling need not be continued over six minutes, and for every 1 Mgm. of invert sugar there will be precipitated 0.0034 Gm. of cuprous oxide, irrespective of the excess of copper reagent present. The cuprous oxide is best caught on a Soxhlet asbestos filter, washed with water, alcohol, and ether, and reduced in a current of hydrogen gas. If the limits above indicated are exceeded, the result will be somewhat irregular.

The quantity of invert sugar originally present is calculated, from the metallic copper found, by dividing the latter by the below given factors (time of boiling, nine to ten minutes).

Copper found. Gm.	Factor	=	Invert Sugar. Gm.
0.300	3.00		0.100
0.275	3.15		0.0873
0.250	3.26		0.0764
0.225	3.33		0.0676
0.200	3.38		0.0592
0.175	3.40		0.0515
0.150	3.40		0.0441
0.125	3.40		0.0368
0.100	3.40		0.0294
0.075	3.38		0.0222
0.05	3 30		0.0151
0.025	3 15		0.0079

The copper carbonate reagent above described has scarcely any action at all upon pure cane sugar, but if invert sugar is present the cane sugar has a decided action. —After *Ber. d. Deutsch. Chem. Ges.*, 1890, 1035.

[*Note by Ed. Am. Drugg.*—It is probable that the above-described copper solution will be serviceable for the determination of glucose in urine. We shall shortly be able to report on this subject.]

Commercial Wood Alcohol: its Tests and Assay.

THE following methods of testing and estimating methylic alcohol are given by Vortmann in his "Anleitung zur chemischen Analyse organischer Stoffe."

Impurities of Commercial Wood Alcohol.—The usual impurities are aldehyde, acetone, methyl-acetate, dimethylacetal, allylic alcohol, ethylic alcohol.

On mixing 1 volume of wood alcohol with 2 volumes of concentrated sulphuric acid, the mixture should not acquire a brown or blackish color.

On diluting 1 C.c. of wood alcohol with 5 C.c. of water, and adding a few drops of bromine water, the latter should not lose its tint (absence of allylic alcohol).

Acetone is detected as described further on.

Ethylic alcohol is detected in several methods. According to Berthelot, the wood alcohol is heated with twice its volume of concentrated sulphuric acid, and the vapors conducted first through pure water, then through bromine water. Methyl alcohol yields gaseous methylic ether, which is readily condensed by water. Ethylic alcohol yields ethylene gas, which is insoluble in water, but is easily taken up by the bromine, with formation of oily ethylene-bromide, in which form it may be estimated.

Another method has been proposed by Riche and Bardy. Carefully mix 3 C.c. of wood alcohol with 6 C.c. of concentrated sulphuric acid, warm in a water bath, add 10 C.c. of water, and distil off 7 to 8 C.c. To the distillate add 5 C.c. of sulphuric acid (containing 23 per cent H_2SO_4) and 10 C.c. of a solution of permanganate of spec. grav. 1.0280. After three to five minutes add to the brown liquid 4 C.c. of a solution of hyposulphite containing 50 per cent of the crystallized salt, and finally 4 C.c. of a solution of fuchsin containing 0.02 Gm. in 1 liter. If the wood alcohol to be tested stands below 80 degrees on the alcoholometer, 30 C.c. of it are mixed with 10 C.c. of sul-

phuric acid, and 12 C.c. are distilled off. To the distillate are added 4 C.c. of sulphuric acid, and the method just described applied. Wood spirit, when thus oxidized, is completely converted into carbonic acid, while ethylic alcohol yields aldehyde producing a violet coloring matter with fuchsin. If wood spirit was present, the liquid obtained has a bright yellow color; but even small quantities of ethylic alcohol render the final tint violet.

Acetone and isopropyl-alcohol yield no color. Butyric and amylic alcohol impart a yellow, and propylic alcohol a grayish-green, color to the liquid.

Dimethylacetal is tested for as follows: Dilute the wood spirit with a little water, acidulate with a few drops of hydrochloric acid, and then add solution of soda and iodine. If the acetal was present, a precipitate of iodoform is produced. This test depends upon the fact that dimethylacetal, when pure and undecomposed, does not give the iodoform reaction, but does so after it has been decomposed by a dilute acid. Hence the test is decisive only when the wood spirit, tested directly with soda and iodine solution, does not give the iodoform reaction—that is, when it contains no acetone. If the latter is present, it must first be removed. The residuary liquid is then acidulated with dilute hydrochloric acid, and the test above described applied.

QUANTITATIVE DETERMINATION OF METHYLIC ALCOHOL.

(a) *Krell's Method.*—Into a flask of the capacity of 100 C.c., and closed with a doubly perforated stopper, fit a small (5 C.c.) drop funnel, and through the other hole of the stopper pass a reflux condenser. Place in the flask 30 Gm. of dry iodide of phosphorus (PI_3), and in the drop funnel exactly 5 C.c. of methylic alcohol measured at 15° C. Allow this to flow, in drops, upon the phosphorus iodide. Then warm the flask gently during five minutes in hot water, and distil off the methyl iodide which had been formed. Collect this in a graduated tube, shake it with water, allow to settle, and measure it at 15° C.

Five C.c. of chemically pure methylic alcohol furnish 7.19 C.c. of iodide of methyl.

(b) *Modification of Krell's Method, according to Grodzki and Kraemer.*—Put into the flask (see previous method) 15 Gm. of phosphorus iodide, cool the vessel, and allow to flow into it 5 C.c. of methylic alcohol in drops. Next add 5 C.c. of a solution of 1 part of iodine in 1 part of hydriodic acid of spec. grav. 1.700, digest one-quarter hour at a gentle heat under an upright condenser, and then distil. Five C.c. of pure methylic alcohol yield 7.45 C.c. of iodide of methyl (in place of 7.8 C.c.).

QUANTITATIVE DETERMINATION OF ACETONE.

Kraemer's method is as follows: Mix 1 C.c. of wood spirit with 10 C.c. of double-normal soda solution, in a flask holding 50 C.c. Afterwards add, under constant agitation, and very gradually, 5 C.c. of double-normal solution of iodine. Agitate the mixture with 10 C.c. of ether free from alcohol, measure the volume of ethereal solution, and evaporate a measured portion of it on a tared watch glass. Dry the residuary iodoform a short time over sulphuric acid, and weigh: 3.94 parts of iodoform correspond to 0.58 parts of acetone.

Messinger's Method.—Into a stoppered flask holding 250 C.c. transfer 1 or 1.5 C.c. of the wood spirit to be tested, add 20 C.c. of normal solution of potassa, next 20 to 30 C.c. of one-fifth normal solution of iodine, and shake briskly during half a minute. Next add enough hydrochloric acid (20 C.c. of normal or volumetric HCl) to just neutralize the normal potassa used, and titrate the excess of added iodine by means of a one-fifth hyposulphite solution. The latter is added until the liquid turns colorless (that is, until there is an excess of hyposulphite present). Starch solution is then added, and the titration completed by means of iodine solution. The amount of acetone present in 100 C.c. of the wood spirit is calculated by the following formula, in which m denotes the amount of iodine necessary for the formation of iodoform [that is, the amount of iodine which had not been neutralized by the hyposulphite], n the volume of wood spirit used for testing, in cubic centimeters and fraction [only 1 to 1.5 is directed to be taken], and y is the desired result, viz., grammes of acetone in the wood spirit:

$$y = \frac{m \times 7.612}{n}$$

As the amount of wood spirit to be used for this estimation is so small, it should be measured in a special burette holding 1 or 1.5 C.c., divided into 0.01 C.c.

Adhesive Paste.—A paste which will stick anything is said by Professor Winchell to be made as follows: Take 2 ounces of clear gum arabic, 1½ ounces of fine starch, and half an ounce of white sugar. Dissolve the gum arabic in as much water as the laundress would use for the quantity of starch indicated. Mix the starch and sugar with the mucilage. Then cook the mixture in a vessel suspended in boiling water until the starch becomes clear. The cement should be as thick as tar, and be kept so. It can be kept from spoiling by the addition of camphor or a little oil of cloves.—*Chem. and Drugg.*

Nevada's Salt Mountains.

THE salt mountains located on the banks of the Rio Virgin, an affluent of the Colorado River in Lincoln County, Nev., cover an area of twenty-five miles, extending to within seven miles of the junction of that stream with the Colorado. The salt they contain is pure and white, and clearer than glass, and it is said that a piece seven or eight inches thick is sometimes clear enough to see through to read a newspaper. Over the salt is a layer of sandstone from two to eight feet thick, and when this is torn away the salt appears like a huge snowdrift. How deep it is has not yet been ascertained, but a single blast of giant powder will blow out tons of it. Under the cap rock have been discovered charred wood and charcoal, and matting made of cedar bark, which the salt has preserved, evidently the camp of prehistoric man.

Gambir Culture in Java.

THE cultivation of gambir in Java has been tried many times, but, although the plant grows excellently, extraction has on every occasion yielded a kind of gambir inferior in quality to that produced by the Chinese around Singapore. It is believed that the cause of this inferiority must be sought in the fact that the Chinese during the boiling process add a decoction of the poppy, but the preparation of this decoction and the parts of the poppy used in its manufacture are a secret. As the sale of opium is a strict Government monopoly in the Dutch colonies, and the cultivation of the poppy is not permitted there, it is believed that there is no possibility for the Java planters to compete successfully in this industry.—*Chem. and Drugg.*

Summer Drinks in India.

THE *Medical Record* of Calcutta contains some interesting remarks upon the beneficial effects to be derived from non-alcoholic drinks in the height of summer. After remarking that the very bane of European existence in India lies in the habits of eating and drinking, physiological arguments are adduced to show that highly carbonated materials are very deleterious in hot climates. The custom of the Moguls, who for luxury have had no equal in Indian history, is referred to as offering a fitting example. Their drinks consisted of milk, sweetened waters, or sherbets prepared from subacid fruits, such as lemons, tamarinds, pomegranates, etc., flavored with rose or Keora essences, date juice, numerous vegetable tisanes, and some infusions of glutinous seeds flavored with sugar and essential oils. These were often cooled with ice collected in pits, where it was stored during the winter months. The Oriental races, it is asserted, suffer from few of the diseases which are common to the meat-eating, wine-drinking Europeans. For a hot day a light vegetable diet is recommended, with a spare quantity of meat food and an abundance of cooling, non-alcoholic drinks. Ice is regarded as a necessity, and coffee, tea, and cocoa are to take the place of whiskey and soda. The use of aërated waters, prepared from pure and wholesome ingredients, and the admixture in them of the numerous fruit flavorings which abound in the tropics, are regarded with favor as likely to offer a lucrative source of income to persons engaged in such trade, while also giving the European community a very acceptable form of summer drinks. This suggestion has already to a certain extent been put into practice both in this country and in America, but there is still some uneasiness as to possible evil consequences resulting from the consumption of large quantities of iced drinks when the atmospheric temperature is high. As regards light diet and extreme moderation in the use of alcohol, however, the recommendations are admirable, and might well be followed here.—*Lancet.*

To Relieve Perspiration of the Feet.

THE season is around again when complaints are made regarding excessive perspiration of the feet, and consequent tenderness of the skin and offensive odor. Here are a few remedies gathered from a correspondence in the *British Medical Journal.*

Dr. John Ormsby, Dover, says: Wash the feet at night with very hot water, put on white cotton socks, and immerse the feet, thus covered, in methylated spirit poured into a basin. Wear the socks all night; they will soon dry in bed. During the evening wear cotton socks and common felt slippers, and keep the socks constantly saturated with spirit. In a week the cure will be complete. The best ventilated boots are made of stout canvas, such as is used for tennis shoes, tan or black. They can be made in any fashion, and will be found a great comfort.

"An Old Member" recommends:

Liq. Plumb. Diacet.	℥ ij.
Acid. Carbolic.	℥ ij.
Aquæ	ad ℥ ij.

M.

One teaspoonful to be mixed with a pint of warm water, and the feet washed every morning and dried with a soft towel.

Mr. Alfred E. Barrett, M.R.C.S., Holland Park, W., writes: Wash the feet night and morning with soap and water, and, after careful drying, sponge them with the following lotion:

Plumbi Acet	℥ i.
Acet. Destill	℥ i.
Sp. Vini Methylati	℥ ij.
Aq.	ad ℥ xvi.

S.

Shoes are preferable to boots, and buckskin leather best of all.

Dr. Mansel Sympson, Lincoln, following Dr. Whitla's advice, has had the best results with boroglyceride. The method of application is simple: Soak a pair of socks in a saturated solution of boroglyceride; let them dry, wear them for a day or two (according to the amount of perspiration), and then change for another pair similarly treated. The fœtor disappears, and the perspiration will decrease in a few days.

"Brigade Surgeon" recommends a solution of chromic acid, 3 to 5 per cent, as the best to harden and prevent perspiration of the feet. Colored socks should be tabooed, and plain white ones worn, steeped in solution of boracic or chromic acid, often changed, and, for summer, cloth boots.

G. F. writes: Wear low shoes, wool socks, and dust the feet twice a day with iodol. Soon the feet become hard, sweet, and comfortable.

There are ideas in the foregoing for profitable summer specialties. For pedestrians and tourists a small linen bag of antiseptic dusting-powder is most portable. It may be made of:

Violet Powder	8 parts.
Boric Acid	4 "
Salicylic Acid	1 part.
Eucalyptus Oil to perfume.	

Mix.

Sometimes the perspiration becomes so profuse as to weaken the sufferer. In such cases a tonic is desirable. Tne following is a very good one for adults, many of whom cannot tolerate quinine during the hot weather:

Tincture of Gentian	1½ oz.
Spirit of Chloroform	3 drachms.
Solution of Strychnine (Brit. Ph. 1%)	48 minims.
Water to	6 oz.

Mix. Dose: A tablespoonful before meals.—*Chem. and Drugg.*

On the Prescription of Alcoholic Stimulants.

THAT it is possible to treat cases, both medical and surgical, and obtain results that are considered perfectly satisfactory, without the use of alcohol either as a food or a medicine, may be accepted as a demonstrated fact. The experience of the London Temperance Hospital shows that patients recover even after severe surgical operations, although alcoholic stimulants are entirely withheld. The experiences of Kane in the Arctic region, and Parkes in the Ashantee campaign, show that, under the very exceptional conditions they encountered, alcohol was not only not necessary, but actually lessened the power of vital resistance. Stanley says that indulgence in alcohol in tropical Africa, even in the form of the lightest beer or wine, is fatal to Europeans. At the same time, it must be acknowledged that in the temperate zone civilized man almost universally uses alcohol as an accessory food, in some form or other, and that physicians, by general consent, accord to alcoholic stimulants an important place in therapeutics. As stated above, there are exceptions to this, and some physicians are opposed to their use absolutely, and appear to have no great difficulty in practising medicine without their aid. But these extreme partisans of total abstinence are rare and far between. The question still undecided is, Do patients recover as quickly, as safely, and as comfortably without alcohol as they do when it is judiciously administered? By common consent this is answered in the negative, with the proviso, however, that as alcohol powerfully influences the vital functions, its physiological action should be kept in mind, and it should be prescribed with as much care as any other toxic agent.

Dr. Burney Yeo, in a recent address,* has taken occasion to protest against the cheap and common qualities of wines so universally used in hospitals in England. The fact is, that foreign wines, so largely consumed both in England and the United States, are more the product of the laboratory than they are of the vineyard. Given a certain quantity of alcohol or high wines, a professional mixer of liquors, with a little caramel and flavoring, will be able to supply any kind of commercial wine or spirits to order. That imported wines are specially prepared for this market is an open secret of the trade, known to customers as well as dealers; what is not generally known is that a large part, possibly the larger part, of the supposed imported wines are manufactured from cheaper wines in this country.

This being the state of affairs, we are ready to welcome and heartily second the efforts of the enterprising, intelligent, and persevering viniculturists who, during the last twenty years, have successfully solved the problem of growing grapes for the production of good, sound, honest domestic wines in different parts of the country. The wine growers of California, however, having special advantages of climate, thus far appear to have distanced all others in the race. It is difficult to understand, except as a matter of habit and routine, why physicians continue to prescribe adulterated and inferior foreign or factitious wines, when a better class of goods, more fitted for the purpose in every way, is offered at a lower price. Americans should drink American wines. Let us encourage domestic industry, especially where, as in some of the wines and brandies, the home products are more reliable, better in quality, and at the same time more reasonable in price.

The culture of the grape in this country has now reached a point where it can successfully compete with Europe. If it receives due encouragement, the benefit will be mutual among producers and consumers, and physicians can prescribe alcoholic stimulants with more discrimination than is usually exercised at present.—*Dietetic Gazette.*

* Before the Section in Pharmacology and Therapeutics, British Medical Association, 1889.

Exorcism of the Pest Demon in Japan.

DR. C. H. H. HALL, of the United States Navy, in a series of notes upon certain medical customs of the Japanese appearing in the *Sei-I-Kwai Medical Journal*, speaks of the curious belief in the demon who causes epidemic diseases, and who seems to be a sort of enlarged and supernatural microbe. His name is Yaku-iin-no-kami, and his habit is to come and sit by the side of the sick person, much to the detriment of the latter. The method of driving away this evil spirit is, Dr. Hall writes, as follows: A kannushi, or Shinto priest, makes a preliminary visit to the sick-room to extract from the demon a promise that he will depart with him at his next visit. The priest returns on the following day, and, taking a seat near the patient, beseeches the evil spirit to come away with him. Meanwhile red rice (used only upon special occasions) has been placed at the patient's head, a *kago*, or enclosed litter made with pine boughs, is brought in, and four men armed with flags or other weapons have entered and stationed themselves in the corners of the room to prevent the demon from taking refuge there. All are silent but the priest. When the prayer is ended, the patient's pillow is hurriedly thrown into the *kago* and the priest cries, "All right now!" The *kago* is then hastily taken out into the street, and the people within and without begin to shout and beat the air with swords, sticks, or anything at hand, while others beat upon drums and gongs. A procession is quickly formed, composed wholly of men, all of whom wear fillets and horns of twisted straw to keep the demon away from themselves. Banners, a drum, a bell, a flute, and a horn are carried. One man chants, as they move away, "What god are you bearing away?" The others reply in chorus, "The god of the pest we are bearing away!" then the drum, the bell, etc., are sounded. While the procession passes through the town all who are not taking part in the ceremony remain indoors, all houses along the way are carefully closed, and at the cross streets are stationed men armed with swords, who guard that street by cutting the air to right and left lest the demon escape by that way. The litter is borne to some retired spot between two towns, where it is left for a time and all who came with it run away, except the priest, who remains for half an hour to complete the exorcism by some sort of magic, after which the patient recovers. Those who carried the litter spend the night in prayer within a temple, and return home next day after a cold bath in the open air, lest they take the demon back with them. One *kago* is used in common by the town, the lightest case being visited first.

Baking Powders.

R. T. WHEELER, in *Science*, details numerous experiments made with a view to ascertaining the influence of baking powder residues on digestion, and, as a summary of the facts brought out by the investigation, finds:

1. That the residues of all baking powders, no matter how pure may be their constituents, have a harmful effect upon digestion, due in all probability primarily to the fact that the salts are acted upon by the hydrochloric acid of the gastric juice, with the formation of more soluble compounds; and, secondarily, that these salts may form organic compounds with albuminous bodies in the same manner as many of the metals do. 2. That calcium phosphate, on account of its great inhibitory action on digestion, must be regarded as a poor agent for the manufacture of a baking powder, while ammonium tartrate may be looked upon with more favor. 3. That the presence of alum in a powder made with calcium phosphate greatly increases its retarding action. 4. That the least harmful baking powder is one containing only the bicarbonate of soda and cream of tartar, and that the presence of any other chemical substance, however harmless it may be in itself, tends only to increase the complexity of the residue and impair the activity of the gastric juice.

THE

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EDITORIAL.

ABOUT as regularly as summer comes do we get an appeal from some pharmacist for shorter hours, and a remarkable fact connected with this subject is that the writer invariably fails to offer any reason why hours should be shorter, but proceeds with more or less lucidity to discuss some other topic—generally the desirability or feasibility of closing shop on Sundays and keeping open during fewer hours on week days.

Since pretty nearly everybody, excepting these individual pharmacists, seems satisfied with the present division of the day into twenty-four hours of sixty minutes each, and as all timepieces now in use are constructed upon this basis, we very much doubt whether any practical result will follow the agitation of the question. We would like, however, to have some of the promoters of the movement explain just what is to be accomplished by having a shorter hour; how much shorter than the present one they would like to have it, and just why the peculiar needs of the pharmacist demand that he should have a shorter hour than anybody else.

We are aware that in some cases the basis for a charge in prescription work is the time required rather than the value of the material, but we doubt whether much could be gained in this way, for the reason that while the person waiting for the completion of a prescription often finds the time go slowly, he is very likely to notice the clock or his own watch, and refuse to accept as satisfactory the statement that the pills required an hour and a half (by pharmaceutical time), at so much per hour, when he is confident of the accuracy of his watch's testimony that only three-quarters of an hour was consumed.

IN regard to the other question of how many hours a pharmacy should remain open daily, there does not seem to be ground for much argument, as it should depend entirely upon circumstances.

For example, there used to be a pharmacy in lower Broadway, in this city, where the receipts between the usual hours for closing and opening more often exceeded one hundred dollars than fell short of it, and it goes without saying that the store was never closed. Employees changed, and had their regular times for work, but the money kept coming in all the time.

On the other hand, we know of a store where the only attendant, besides the cat, was a sleepy, ill-kempt, and dirty old man, who wore slippers and spectacles and smoked a pipe pretty much all day. He rarely washed himself, and his windows—never. In course of time his stock consisted largely of dead flies, a most unappetizing soda-water apparatus, and a few pharmaceuticals, among which veterinary specialties were rather conspicuous. So far as any apparent profit would indicate, he might just as well have closed his shop entirely; and in fact there came a time when he did, and the only mystery about it was that he didn't do so long before.

There can be no doubt that the public have become accustomed to finding drug stores open until long after all other places of business, excepting liquor stores, are closed. This has come about through the need for prescriptions written by doctors who have occasion to make late visits. But there is no good reason why the establishment should be kept open upon the same scale as during the early evening. The gas can be turned down and the place left in the care of the proprietor or a prescription clerk and an errand boy after eight or nine o'clock in most cases, and in this way the public may be led to appreciate that the store continues to be open as a matter of accommodation for those who may need medicines rather than for the sake of profit. The same may be said regarding opening for business on Sundays. One of the most successful prescription stores in this city used to have its showcases and soda fountain covered with muslin and its shades lowered on Sundays, the door open, and an attendant or two in "Sunday clothes" ready for any legitimate business. Anything was sold which was asked for, but the general appearance of the place was intended to give the impression that this was Sunday, and the store was kept open only because it was essential to the welfare of sick people.

That proprietor was a conscientious man, a good Christian, and a man of such good business methods that he retired with a fortune. His patrons respected him and paid him good prices, because they had confidence in his integrity and honesty.

THE proprietor is very short-sighted and penny-wise who requires too prolonged attendance by his clerks. If the circumstances of location and business require that the store should be open from early in the morning until late at night, every employee should be *required* to take some time during the day out of the shop, and have a change of occupation and some amusement. If only one person besides the proprietor is competent to prepare prescriptions, then they should co-operate to enable each to have a run outside on business or pleasure. The "dull boy" who is the result of "all work and no play" is the one who makes mistakes in prescription work, gets careless in regard to habits, and is easily disturbed by the unreasonable demands of customers. And it is more often the overworked assistant, with a hope of greater freedom, than a newcomer who opens the competing store on the next block.

ANOTHER phase of this question seems to have escaped the attention of the promoters of this movement—the fact that the labor of professional men is not regulated by hours, as in the case of artisans and trades-people. It would be a strange thing indeed to find a lawyer, editor, clergyman, architect, or doctor who worked only for a certain number of hours in each day; on the contrary, their work begins as early as possible and continues, oftentimes, well into the night. It is not a question of a limit for working time so much as a limit of working capacity. This must be also true of the dispensing pharmacist. While the wholesale druggist or manufacturer, who comes into business contact with the trade only, may open and close his place of business at such times as are customary with business houses, the *professional* pharmacist must conform, rather, to the customs of other professional men, or abandon the professional features of his business.

WHY is it that whenever there is an instance like one of recent occurrence in Brooklyn, in which a man in the last stages of a fatal malady died after taking a dose of a poisonous alkaloid, that the newspaper editor at once assumes that a drug clerk has made a mistake and that it was this which caused the death, rather than the disease?

For many years past the judicial investigations of the few cases of this nature which have been made public have generally resulted in the absolute vindication of the drug clerk, and shown that death has been due to natural causes or the physician's want of judgment; nevertheless editors of the daily papers invariably *jump* on to drug clerks as if it were an established truth that he is always to blame. In the instance above referred to a thoroughly competent man, with a good reputation and a family to maintain, has been vilified by the daily papers, as if the only care the editors have in such a case were to make it the subject of a sensational screed and sell their papers. We would like to see a systematic attempt made to bring suits for slander and defamation of character in a few of these cases. The managers of public prints might find this mode of *booming* their publications rather more expensive than judicious, and learn that, until proven to be unworthy, even a clerk in a drug store has a right to his good name and the respect of the community in which he lives.

"PYOKTANIN," the new antiseptic and bactericide, appears to be nothing else than one of the methyl violets, probably that known as "3B." Experiments made at one of the New York public hospitals have shown this.

The use of methyl violet and other aniline derivatives as disinfectants, which comes to us as a novelty, and that a costly one, from Germany, is not so new after all. During the discussion of a paper read by Dr. Chas. O. Curtman, in June, 1882, before the Medico-Chirurgical Society of St. Louis, Mo., and published in the *Courier of Medicine*, August, 1882, the doctor called especial attention to the prospect of using the aniline dyes successfully as bactericides, basing his belief on the great avidity for absorption of these colors shown by the various bacilli then discovered.

AN English correspondent, referring to some remarks on page 19 of this volume relative to the patent on antipyrin, writes to us that he has had occasion to look into this question very thoroughly, and can

> "assert without fear of contradiction that the German patent was taken after the matter had been published by the inventor; further, that the English patent was taken some time after the whole of the patented matters had appeared in the patent books and were in the library of the Patent Museum. All this was worked out with the assistance of patent agents and counsel, as it was the intention of Mr. —— to start the manufacture of antipyrin in this country. We found that there was no valid patent here."

American Pharmaceutical Association.

The thirty-eighth annual meeting of the American Pharmaceutical Association will be held at Old Point Comfort, Virginia, first session Monday, September 8th, at 3 P.M.

Although I have no official notice on the subject, I understand that the Virginia Pharmaceutical Association have postponed their meeting to the same date, with the intention of holding it simultaneously with that of the A. P. A. and at the same place.

In view of our convention being held in such a delightful location and one so easily accessible from all parts of the country, it is hoped and expected that we will have one of the largest meetings held for years.

Full information regarding hotel and railroad rates will be furnished our members later on, in the usual annual circulars.

All matters concerning exhibits, etc., will be taken in charge by the local Secretary, Mr. Charles E. Dohme. Any communications in regard to same, sent to his address, cor. Pratt and Howard streets, Baltimore, Md., will receive prompt attention.

All papers to be read at the next meeting should be forwarded at as early a date as possible to Prof. H. M. Wheepley, No. 113 Market Street, St. Louis, Secretary of Committee on Scientific Papers.

Owing to the lamented death of our much-esteemed President, Prof. Emlen Painter, it devolves on the undersigned to issue this call.

KARL SIMMON,
Acting President.

ST. PAUL, MINN., June 18th, 1890.

Pharmaceutical Associations.

Missouri Pharmaceutical Association.—At the meeting held at Excelsior Spring on June 4th, the Association showed a membership of nearly one thousand, with nearly four hundred in attendance. It elected as president W. E. Baird, of Sedalia.

Massachusetts Pharmaceutical Association.—On the 18th of May the Association met at Haverhill and elected as president E. C. Marshall, of Charlestown; vice-presidents, G. W. Cobb of Newton, C. B. Emerson of Haverhill, and F. T. Whiting of Great Barrington; as directors, E. C. Marshall, G. W. Cobb, F. T. Whiting, C. B. Emerson; secretary, J. W. Colcord; treasurer, I. B. Nichols, of Salem. Boston will be the meeting place in 1891.

Ohio Pharmaceutical Association.—President, F. N. Heath, of Toledo; vice-presidents, P. Acker of Cleveland, and H. G. Eady of Elyria; secretary, L. C. Hopp, of Cleveland; treasurer, F. A. Krantz; executive com., J. H. Von Stein of Upper Sandusky, P. Nehr of Cleveland, and C. E. Ink of Columbus; delegates to Pharmaceutical Section of the A. Med. Assoc., J. U. Lloyd of Cincinnati, L. C. Hopp and G. P. Kauffman of Cleveland. The next meeting will be at Dayton on June 9th, 1891.

Washington Pharmaceutical Association.—On the 12th of May a State Association was founded at Tacoma, in completion of a project inaugurated at Olympia in January last. Nearly seventy members were present, and there is reason to believe that the Association will soon have more than two hundred. The officers are: President, A. C. Clark, of Olympia; vice-presidents, W. P. Bonney of Tacoma, W. H. McCoy of Spokane Falls, and W. A. Hasbrouck of Seattle; secretary and treasurer, W. St. John, of Tacoma. The next meeting will be at Ellensburg in May, 1891, and D. O. Woodworth will be local secretary.

Tennessee Pharmaceutical Association.—At the meeting held in Nashville May 21st the Association elected as president R. H. Gordon, of Nashville; vice-presidents, D. F. Goodyear of Memphis, and D. F. Voight of Chattanooga; secretary, J. L. Thompson, of Nashville; treasurer, C. L. Laurent, of Nashville. The next meeting will be at Knoxville in May, 1891.

Pennsylvania Pharmaceutical Association.—At the annual meeting held in York on the 10th of June, there were elected for the ensuing year: President, J. H. Stein, of Reading; vice-presidents, J. F. Patton of York, and W. H. McGarrah of Scranton; secretary, J. A. Miller, of Harrisburg; treasurer, J. L. Lemberger, of Lebanon; executive com., J. H. Redsecker of Lebanon, C. T. George of Harrisburg, and W. Harris of Hamburg. Bedford Springs will be the place for the next meeting.

Kansas Pharmaceutical Association.—At Topeka, on the 20th of May, the Association held its eleventh annual meeting, and elected as president C. D. Barnes, of Abilene; vice-presidents, C. L. Becker of Ottawa, and J. Hurst of Newton; secretary, A. T. Waggoner, of Topeka; treasurer, H. W. Spangler, of Perry. On the third Tuesday of May next the Association will meet at Ottawa. The Association has two hundred and seventy-five members, twenty-six of whom are recent additions.

Kentucky Pharmaceutical Association.—Not quite seventy members assembled at Richmond on the 21st of May. J. J. Brooks of that place was elected president, and the Association will try Frankfort next year.

Oregon Pharmaceutical Association.—This association was organized at Portland on June 10th, and the following-named officers elected: President, M. M. Davis, of Yaquina City; vice-presidents, G. C. Blakeley of The Dalles, T. Graham of Corvallis, and G. L. Blackburn of Albany; secretary, H. D. Dieterich, of Portland; treasurer, L. G. Clarke, of Portland; executive com., F. Newlin of La Grande, L. Kuebler of Pendleton, J. L. Rogers of McMinnville, O. P. S. Plummer, W. M. Wisdom, and J. A. Rupert, of Portland, and J. J. Fisher of Albina. The next meeting will be at Portland, June 9th, 1891.

Chemical Exhibition at Manchester.—A permanent chemical exhibition has lately been inaugurated at Manchester, England, which already contains a large number of interesting objects, and it is expected the collection will constantly grow in value and extent. Among the novelties is a show of ozonized products from the St. Helen's Ozone Works, Plaistow. Among them is esparto pulp bleached by ozone. Where this agent is employed there is said to be absolutely no "going back"; in fact, an imperfectly bleached material will become whiter by standing, as though some residual ozone were slowly spreading itself, and thereby gradually bleaching the fibres. Ozonized water, suitable for killing microbes and for sterilizing purposes generally. Ozonized oil; this is available either for medical or manufacturing purposes. Ozone-ammoniated lime, the peculiarity being that a considerable quantity of nitrogen is said to be fixed in combination with the lime. Ozone-oxidized mangan, a high oxide of manganese, formed by the action of ozone on a lower oxide. A bleached solution of sugar; before treatment with ozone this liquor was jet black. The bleaching may be performed either before or after boiling. It is also applicable to dry sugar of all grades.

Preparation of Pure Albumen.

PROF. ERICH HARNACK has succeeded in devising a method by which egg albumen may be freed so thoroughly from the inorganic matters which so obstinately adhere to it that it may be regarded in practice as absolutely pure. He has also found that albumen thus purified is perfectly soluble in cold or boiling water, and that *it is not coagulated or rendered insoluble by heat.*

The method adopted for purifying albumen is, in the main, to prepare first as pure a combination of albumen with copper as possible, and then by repeated solution and precipitation to isolate the substance in a pure state.

As the process involves considerable loss of product, it is necessary to start with a considerably larger quantity of albumen than is finally expected as product.

A quantity of albumen is mixed with water and plenty of acetic acid, the filtered solution exactly neutralized, again filtered, and then precipitated with solution of copper sulphate. The resulting bluish-green, flocculent precipitate is carefully washed with water, then diffused in a small quantity of water, dissolved by the addition of a little soda, and immediately reprecipitated by neutralizing with acetic acid. (The freshly precipitated metallic albuminate is soluble both in an excess of the alkali and in an excess of the acid; on neutralizing the solution it is always reprecipitated.) The same operation is repeated, the precipitate again most carefully washed, then dissolved in an excess of soda solution, and the dark-bluish-violet, almost gelatinous, liquid set aside during twenty-four hours. This causes the decomposition of the copper albuminate through the influence of the strong alkali. Upon adding, after the lapse of the prescribed time, enough hydrochloric acid to neutralize the liquid, a colorless, flocculent precipitate of albumen will be obtained which is no longer soluble in an excess of the acid, and which settles easily, while the light-green liquid which holds all the copper in solution readily passes through the filter. On washing the precipitate upon the filter—which must be done carefully and thoroughly—it will be noticed that the precipitate (albumen) swells up and begins to be dissolved by the wash water. This inevitable loss renders it necessary to take into operation a much larger quantity than is expected as product. When the albumen has been completely washed, it is transferred to a platinum capsule and evaporated to dryness. This can be done in a drying closet at a temperature of 100° C. or over. Instead of coagulating, the albumen will at first melt, and finally dry up to a glue-like, transparent, very hard and brittle mass. It is extremely difficult to powder. Prof. Harnack had made for this special purpose a very deep and rather narrow agate mortar, as a metallic mortar would have introduced impurities which he wanted to avoid.

Albumen thus purified contains only about 1 per mille of ash, which is so little that it may be considered as practically absent. At all events, the albumen is absolutely free from phosphorus and phosphates.

The chief properties of this ash-free albumen are the following: When moist it gradually swells up in pure water, becomes yellowish-translucent, and finally forms what may be called a solution in water. Boiling greatly hastens the solution. On adding acids to the albumen swelled up by water, it cakes together and becomes crumbly or flocculent. Albumen which had been completely dried is only very slowly swelled up or "dissolved" by water; but if it is powdered and treated with boiling water, a clear, colorless solution soon results.

The ash-free albumen is neither coagulated nor converted into an insoluble modification on boiling its solution.

Ash-free albumen is precipitated from its aqueous solution—

1. By acids, an excess of which does not dissolve the precipitate.
2. By solutions of neutral salts, even when very dilute; the precipitate dissolves only upon strongly diluting the liquid.
3. By metallic salts, phosphotungstic acid, ferrocyanide of potassium, and other common precipitants of albumen. *But it is not precipitated* by alcohol, ether, phenol, or tannic acid.

The circumstance that the ash-free albumen is not precipitated by alcohol distinguishes it from all other albuminoids; and yet it is a genuine albuminoid itself.

Abuse of Purgatives.

PROFESSOR SÄNGER, at a meeting of the Medical Society of Leipzig, spoke very strongly on the abuse of purgatives. He complained that not only did the public buy immense quantities of aperient pills, draughts, and waters, but that practitioners also pandered disgracefully to the craving for instantaneous relief from constipation, so common amongst patients. Quack laxative medicines were advertised in every newspaper, on walls, in stations, and on the trees and rocks in romantic districts of Europe frequented by tourists. The competition in invention of a new secret purgative was very keen. In this respect, a Polish doctor was not wise in his generation. This gentleman—who, according to Dr. Sänger, appeared to have no special anxiety about his patients' vermiform appendages—prescribed gravel, and boasted that he had already prescribed whole cart-loads; but a drug which anybody could scrape up in his garden could not be patented, and, therefore, would never gain the confidence of the public, who love mystery in purgatives as in other matters. Professor Sänger said that the abuse of these drugs caused, not habitual constipation, but rather "artificial constipation." The evil was most prevalent amongst women with chronic pelvic diseases, real or imaginary. He ordered, in such cases, that all purgatives be discontinued. He never had bad results, even when constipation lasted for over a week. Belladonna was the only drug he ever used when flatulence, etc., set in, and when the constipation lasted for very long. He objected to dieting, which kept up a pernicious feeling of invalidism, and, finding that the patients drank little water, he made them take several glasses of filtered water daily, when fasting; occasionally whey or buttermilk was given as a change. Fruit, brown bread, and exercise were recommended. Professor Sänger found this treatment far better than massage, visits to watering places, enemata, and other familiar means to the same end. In the long run his patients had natural actions of the bowels, and were cured of their invalidism.—*British Medical Journal*, June 7th, 1890.

Ethereal Oils as By-Products.

DIETERICH points out that in the extraction of aromatic vegetable drugs by water only a small proportion of the ethereal oil contained in them can be dissolved; the greater part remains in the exhausted and apparently worthless marc. Still more noteworthy is the fact that the same is evident in the preparation of alcoholic extracts. If the exhausted and pressed substance is distilled by blowing steam through it, a full yield of essential oil is obtained from the residues of aqueous extracts and a partial yield from those of spirituous menstrua. The author obtained such oils from the residues from extractum absinthii, aurantii cort., calami, cascarillæ, inulæ, achilleæ, myrrhæ, sabinæ, valerianæ, from succus juniperi, and from syrupus aurantii cort., chamomillæ, cinnamomi, fœniculi, menthæ pip. There has been a widespread impression that succus juniperi is prepared from the previously distilled berries; the experience of Dieterich indicates the reverse, namely, that the oil is obtained after the juice.—*Br. and Col. Drugg.*

A New Synthesis of Indigo.

A NEW and very simple method of synthetizing indigo has been discovered by Dr. Flimm, of Darmstadt (*Berichte*, No. 1, 1890; *Science*). In studying the action of caustic alkalies upon the monobromine derivative of acetanilide, $C_6H_5NH.CO.CH_2.Br$, a solid melting at 131.5°, it was found that when this substance was fused with caustic potash, a product was obtained which at once gave an indigo-blue color on the addition of water, and quite a considerable quantity of a blue solid resembling indigo separated out. The best mode of carrying out the operation, according to *Nature*, is described by Dr. Flimm as follows:

"The monobrom-acetanilide is carefully mixed with dry caustic potash in a mortar, and the mixture introduced into a retort, and heated rapidly until a homogeneous, reddish-brown melt is obtained. This is subsequently dissolved in water and a little ammonia or ammonium chloride solution added, when the liquid immediately becomes green, which color rapidly changes to dark blue, and in a short time the blue coloring matter is for the most part deposited upon the bottom of the vessel in which the operation is performed. The fused mass may also conveniently be dissolved in dilute hydrochloric acid, and a little ferric chloride added, when the formation of indigo takes place immediately. The collected blue coloring matter may be readily obtained pure by washing first with dilute hydrochloric acid and afterward with alcohol."

That this blue substance was really common indigo was proved by the fact that it yielded several of the most characteristic reactions of indigotin, such as solubility in aniline, paraffin, and chloroform; its sublimation; and the formation of sulphonic acids, which gave similar changes of color with nitric acid to those of indigotin. The final proof was afforded by its reduction to indigo-white and reoxidation to indigo-blue by exposure to air. Moreover, the absorption spectrum of the coloring matter was found to be identical with the well-known absorption spectrum of indigo; hence there can be no doubt that indigo is really formed by this very simple process.

A Simple Form of Quick Filter.

THERE have been many good forms devised for a quick filter, and the principal objection to them collectively is that they are too expensive and cumbersome to be given out to every student. The writer has long felt the need of some form which would take little apparatus and cost as

little as possible. The following form has recommended itself, since its design by the writer about a year ago, by its uniformly satisfactory performance under every test:

A platinum disc, 1 inch in diameter, is cut from ordinarily stout foil. This is then perforated by a steel point with small holes, placed about the same as in Cook's modification of Dr. Carmichael's reverse filtering button. A margin of about one-sixteenth inch ought to be left unpierced. The disc thus prepared is placed in a funnel, which can be cut off, if desired, so that the disc will be about one-quarter inch below the rim of the funnel. A smaller disc of filter paper about one-sixteenth inch larger than the disc is now placed in the funnel just above the disc. Water is applied and pressure turned on. The paper at once settles down and makes an air-tight joint at the edge of the disc. The precipitate can now be brought on the paper and washed as usual.

The results are as good, as to rapidity, as in case of any form of quick filter, and the ease and convenience attending its use will, I hope, recommend it to some chemists.—JOSEPH TORREY, *in Chem. News.*

A Woman, charged with drunkenness at the Southwark [London] police court the other day, excused herself upon the ground that she had "to use a great deal of chlorodyne."

Detection of Terpin in the Urine.—M. Loison has devised a simple plan for detecting terpin in the urine in very small quantity, based on the fact that his substance, when treated with hydrochloric acid, evolves a hydrocarbon which colors chloride of antimony red.

Cascara Sagrada Wine.—A useful wine may be prepared by mixing one part of fluid extract of cascara sagrada with nine parts of sherry. After macerating for eight days, the mixture must be filtered, and will then be ready for use. The dose is a small wineglassful.

Pepsin and Pancreatin.—*New Idea* states that there is pepsin now in the market fully five times the strength of what was offered at the beginning of the present decade. There has been a similar improvement in pancreatin. Four years ago only three specimens out of twenty were found to be better than sawdust; now the poorest in the market is equal to the best of that time.

Explosion of an Oxygen Cylinder occurred on January 23d at the Rosehill works of the Scotch and Irish Oxygen Company, Polmadie. While the foreman was in the act of carrying a cylinder, it unaccountably exploded with great force, injuring him fatally. Portions of the cylinder were afterward found a quarter of a mile off, although fences were penetrated in their flight.—*Scient. Am.*

Compound Licorice Powder as an External Remedy.—A New York physician gave a patient, suffering from inflamed testicle, prescriptions for compound licorice powder and tincture of iodine, and was greatly surprised by the rapid recovery which followed the taking of a teaspoonful of the tincture internally, and the rubbing of the powder into the swollen scrotum. We are not sure which amuses us the most—the error of the patient or the title which the doctor gives to his paper, in which the cure is attributed to the external use of the powder.

Antidiphtherin is the name of a medicinal specialty which has lately been introduced in Germany. Dr. A. Donner finds that it is a mixture of 4 parts of ferric chloride and 96 parts of potassium chlorate.—*Chem. and Drugg.*

[*Note by Ed. Am. Drugg.*—A combination of these two agents, in various proportions, usually in combination with glycerin, and in suitable dilution with water, has long been used in diphtheria and other forms of inflammatory sore throat.]

Narceine with Anæsthetics.—At a recent meeting of the Academy of Medicine, M. Laborde announced his discovery of the fact that crystallized *narceine* prevents the vomiting and digestive derangement which often follow the administration of chloroform; moreover, the narceine is claimed to prevent fatal consequences in persons to whom chloroform is administered by inhalation. That is what the experiments on rabbits are reported to have yielded—but man has yet to be tried.—*Paris Corresp. of Chem. and Drugg.*

The Bouquet of Wines and Brandies.—M. A. Rommier shows in a paper contributed to the Academy of Sciences that different ferments produce from the same grapes wine of different flavor, and that solutions of sugar, fermented by means of the natural ferments obtained from different districts, yield on distillation alcohols possessing different odors; and it is suggested that the characteristic bouquet is due to a compound ether formed from the alcohol combined with a fatty acid produced from the fat, which each ferment manufactures from the sugar for its own use.

Castor Oil Draught.—

Syr. Rhei Arom	℥ iv.
Sodii Bicarb	gr. xv.
Acid. Tartaric	gr. v.
Aq. Menth. Pip	℥ iss.
Ol. Ricini	q. s.

Dissolve the soda in the arom. syr. rhubarb, then add the tartaric acid and stir well. Now pour the peppermint water carefully down the side of the tumbler, so as not to disturb the foam, and then pour the oil through the centre of the foam, and drink.—*Registered Pharmacist.*

Automatic Mineral Water Apparatus.—A Parisian correspondent of the *Chemist and Druggist* writes: There has been a great rush on the automatic drinking bar in the Rue Montmartre during the warm weather with which we have been favored of late. This bar has a couple of dozen of the largest sized automatic tanks containing all sorts of drinks, including mineral waters. It is usually thronged with workmen, but is shunned by the Paris masher, who requires a lot of attention either from a polite waiter or a pretty barmaid. This attention is not forthcoming at the automatic bar.

Resorcin as an Anti-Emetic.—Although impure resorcin, as a rule, causes nausea and vomiting, the chemically pure article, according to Andeer, is the surest anti-emetic that can be administered in all kinds of vomitings from the most varied causes, even in the persistent vomiting of hepatic, renal, and menstrual colic, in the pernicious vomiting of pregnancy, in sea-sickness, in vomiting after over-indulgence in food, drink, etc. It may be given in solution or powder in daily quantities of from 0.5 to 3.0 Gm.—*Ther. Monatshefte.*

The True Inwardness of Antisepsis.—The progress of bacteriology has shown that aseptic surgery means scientific cleanliness; the same lines of investigation, says the *British Medical Journal*, show how very dirty people can be. Seventy-eight examinations of the impurities under finger-nails were recently made in the bacteriological laboratories of Vienna, and the cultivations thus produced showed thirty-six kinds of micrococci, eighteen bacilli, three sarcinæ, and various varieties; the spores of common mould were very frequently present.

The Pharmaceutical Press Abroad.—Pharmacy in foreign parts has been enriched by the establishment in Spanish America of two journals devoted to the craft, viz., *La Farmacia* (Mexico) and *El Progreso Medico-Farmaceutico* (Buenos Ayres). As a set-off against this advance in the west, we have to record the sad fact that the only chemical journal published in the Hungarian language has bled to death for want of support. It was published at Klausenburg under the title of *Vegytani Lapok* (leaves of chemistry). These particular leaves could never strike root, though they vegetated for a long time.—*Chem. and Drugg.*

William Woodward, a member of the firm of E. Fougera & Co., importers of French drugs at No. 30 North William street, died July 5th, of Bright's disease, at his home, No. 172 Clinton street, Brooklyn. Mr. Woodward was in the fiftieth year of his age, and was born at Georgetown, D. C. He removed to Brooklyn in early life and was educated there. While a young man he was a clerk in his father's store. When the war broke out he entered the navy, rose to the rank of paymaster, and served on several leading vessels. Upon returning home he re-entered business and was employed in the wholesale paint store of S. S. Townsend. About a dozen years ago the business of E. Fougera & Co. was purchased by Messrs. Woodward & Heydenreich, and has since been conducted by them.

Important Trade-mark Decision.—A judgment has just been given in the French law courts which is of considerable importance as affecting the marking of goods with a false place of origin. The town of Bar-le-Duc has long been famous for its confections, and the trade in these goods, which is of considerable value, is mainly in the hands of six old established firms of "confiseurs." The fame of the "confitures de Bar" excited the jealousy of two firms of confectioners in Ligny, who proceeded to place their goods on the market labelled as "*Confitures de Bar.*" For doing so they have been prosecuted by the six genuine Bar confectioners jointly. The judgment of the lower court went against the Ligny people, and this has been confirmed on appeal, a permanent injunction having been granted, which will prevent any firms not actually located in Bar-le-Duc from exploiting the reputation of that ancient fortress by using its name on their goods.

A New Bill on Wine Manufacture.—The French Senate has under discussion a bill introduced by M. Griffe, with the objects of placing under official control the raisins used for making wine, of tracing the different uses to which raisins are put in wine manufacture, and of giving publicity to applications for sugar at reduced rates used in sweetening the vintage, etc. Prohibitive measures are required, says the introducer of the bill, to protect the public health and in the interests of commercial integrity. It would seem, however, that M. Griffe has taken up the cudgels for the Bordeaux wine growers, to the detriment of all others. His bill is not likely to pass as it stands at present. It is well known that certain Burgundy vintages require the addition of sugar, especially when, after a cold summer, the grapes are too acid. Also, wine made from raisins may be in no way detrimental to health, though few people would purchase it if labelled "raisin wine."

QUERIES & ANSWERS.

Queries for which answers are desired, must be received by the 5th of the month, and must in every case be accompanied by the name and address of the writer, for the information of the editor, but not for publication.

No. 2,465.—**"Schweizer Pillen"** (Swiss Pills) (E. J. W.).

This nostrum, which is much advertised in Germany and other Continental countries, is reported to consist of the following ingredients:

Extract of Aloes (or of Cascara)	30 grains.
" " Gentian	30 "
" " Frangula (or of Rhubarb)	90 "
Powd. Gentian	q.s.

Make into pills weighing 2 grains each.

No. 2,466.—**Teinture de Mars Tartarise** (C.).

This is a weak alcoholic solution of tartrate of iron (ferrous and ferric) and potassium, which was formerly official in the French Pharmacopœia. It is prepared as follows:

Iron filings	100 Gm.
Tartrate Potassium and Sodium	250 "
Alcohol	50 "
Water	3,000 "

Put the iron filings and cream of tartar into an iron vessel, and add enough water to make a thin magma, and macerate for twenty-four hours. Then add the remainder of the water and boil for two hours, frequently stirring and replacing the evaporated water. Allow to settle, decant the supernatant liquid, filter, and evaporate it until it has a spec. grav. of 1.280. Next add the alcohol, mix thoroughly, filter, and put into bottles.

This preparation is, properly speaking, not a tincture.

No. 2,467.—**Methylene Blue as Medicine** (Several Inquirers).

We are aware that there has been a demand recently, from a number of physicians, for "methylene blue," but we are in a position to know that, in most cases, this was intended to be used as a staining agent for pathological sections. More recently, however, the coloring matter has been experimented with as an internal medicine, being given as an anodyne in doses from about 1½ grains up to 10 or more grains. If wanted for this purpose, a *pure methylene blue* should be used, but we do not believe that there is any of the pure material as yet on our market.

We therefore caution our readers to procure or order for internal use only such "methylene blue" as is free from metallic impurities. As there is none in the market as yet, it will not be long before the leading houses will have a stock of it.

The substance known in trade as "methylene blue" (see p. 143 of this number) is either the hydrochlorate of tetramethyl-thionine, or the double chloride of zinc with this base. The last is the only one now obtainable here. This salt has the composition $(C_{16}H_{18}N_3SCl)_2.ZnCl_2.H_2O$, and, therefore, contains 17.15 per cent of zinc (Zn).

In commerce it is also known as "ethylene blue" or as "methylene blue D. B. B."

A salt free from zinc leaves no residue upon ignition. If a residue is left, the usual analytical methods will identify the metal.

No. 2,468.—**Color of Ferric Hydrate** ("Ferrum").

This subscriber writes: "Will you kindly inform me why there is a difference in the color of the oxide of iron produced, according as the iron solution is added to the magnesia mixture or vice versa? If the iron solution is poured into the magnesia mixture, a dark-brown or red mass is produced; but by following the directions of the Pharmacopœia a light reddish mass results."

The difference in tint is owing to the fact that, when the iron solution is poured into the magnesia mixture, some of the ferric hydrate formed mechanically occludes or retains some of the undecomposed iron solution, which causes the darker tint of the precipitate. The decomposing agent—viz., the magnesia which surrounds the liquid poured in—and the precipitate first thrown down by it, are no longer able to reach the interior undecomposed portion unless the mixture is briskly stirred. This will, of course, eventually bring about the same result as is obtained by proceeding in the correct manner; but it usually takes a long time to break up all the small lumps of precipitate so that the magnesia can reach any of the unaltered iron solution. It is different when a soluble alkali (soda or potassa or ammonia) is used. These are able to penetrate wherever water can. But magnesia cannot pass through the minute intermolecular interstices.

On the other hand, when the magnesia mixture is poured into the iron solution the conditions are reversed. There is always an excess of magnesia present, wherever any may happen to be, until stirring has brought about decomposition.

No. 2,469.—**Aromatic Mouth Wash** (P. E. & Co.).

We are informed by several of our friends that the formula for a fragrant and antiseptic mouth wash published by us in previous issues has given very decided satisfaction and has met with a considerable sale. Naturally, each of our correspondents introduced a slight modification, sufficient to render his product dissimilar to others. In one case a very small quantity of red coloring matter was all the alteration made.

One of our friends, who has used the preparation for his private comfort and not for sale, informs us that the addition of a small amount of oil of calamus appears to render the flavor of the mixture more lasting and acceptable. In order to place the modified formula at the disposal of our readers, we publish it here:

Oil of Sassafras (preferably "Safrol")	720 min.
" " Pinus Pumilio	240 "
" " Curaçao	240 "
" " Wintergreen	48 drops.
" " Calamus	60 "
" " Anise	12 "
" " Rose Geranium	12 "
" " Vertivert	12 "
Naphthol (Beta)	120 grains.
Solution of Saccharin (N. F.)	1 fl. oz.
Chloroform	½ "
Glycerin	1 pint.
Alcohol	3 pints.
Calcium Phosphate	q. s.
Water	enough to make 12 pints.

In the alcohol dissolve the oils, naphthol, and chloroform. Add to the solution the glycerin and solution of saccharin, and gradually add water until the product measures 12 pints. Allow the mixture to stand some time, frequently shaking; then mix it intimately with about 4 oz. of calcium phosphate, and filter.

No. 2,470.—**Sugar Coloring** (B. W. & Co.).

We are asked to give a method for preparing "sugar coloring" which is not too thick and will not impart a bitter taste to liquids which are to be colored by it.

The commercial sugar coloring or caramel has, indeed, often a disagreeably burnt and bitter taste, though this is frequently of no importance, as the quantity of coloring matter required is usually quite small. Still, if our correspondents desire to prepare themselves a coloring matter free from bitterness, we advise them to use the following method, which has long been in use in Europe, and which furnishes a product of thin fluidity and of good keeping qualities.

Moisten 1,000 parts of crushed or granulated sugar with 400 parts of water, and heat the mixture in a porcelain or agate-ware basin, standing on a sand bath heated by a moderate flame, with constant stirring until the mass becomes colored, emits penetrating fumes, and gradually has acquired a brownish-black or black color. As the mass swells up considerably, a capacious vessel must be used. After the mass has turned dark brown, a drop must be removed from time to time and chilled off with cold water. If it is hard and easily friable, and turns out to be completely soluble in water of ordinary temperature, the process should be interrupted. The product should still possess a sweet or sweetish taste. It is now poured, in a thin stream, into another vessel containing 2,000 parts of hot water, and allowed to cool. Next, 2,000 parts of alcohol are added, the mixture allowed to stand a few days, and then filtered. One part of sugar should yield about 5 parts of product.

Sugar coloring is often used to color liquids containing alkaloids, for instance, certain elixirs (Elixir Quininæ Comp., etc.). In this case it is necessary to use a coloring free from alkalies, or rather alkaline carbonates. The absence of these may be recognized by the fact that chloride of barium, added to a dilute solution of the coloring, produces no cloudiness even on prolonged standing. For ordinary use caramel is usually prepared by adding to the sugar 2 or 3 per cent of an alkali carbonate, and copper boilers are used for heating.

No. 2,471.—**Quantitative Determination of Albumin in Urine** (B. F. J.).

The method which we prefer is gravimetric, simple, and, if properly executed, gives reliable results. Of course its execution requires a suitable drying oven and good balances. In this case the albumin obtained is that which is coagulated by heat, and it is weighed after being dried at 100° C.

A definite quantity of the urine—about 100 Gm. when only a small amount of albumin is present—is warmed in a beaker, and a very dilute (1 per cent) acetic acid added, drop by drop, until the albumin begins to separate in large flakes. The liquid is now boiled and filtered through a good platinum filter lined with a film of asbestos, a filter pump being used for hastening filtration. The filter is washed with water until the washings no longer react for chlorides. (It may be presumed that when no more chlorides are present, all other soluble matters of the original urine, except the albumin, have been washed out.) The filter is then washed with alcohol, and lastly with stronger ether, and finally dried to constant weight at 100° C.

There are other methods of estimating the amount of albumin. One of those which are at present much used, but is only relatively reliable, is Esbach's. It depends upon ascertaining the height of the precipitate, formed in a graduated tube, by a particular reagent within a given time at a certain temperature. The tube or albuminometer required for it is in form of a large test tube, provided with a stopper. The tube is graduated from below upward with figures (½, 1, 2, 3, 4, 5, 6, 7), each of which represents the amount of albumin, in grammes, contained in 1 liter of the urine. Near the centre of the tube is a mark, U, up to which it is to be filled with urine. And nearer to the top is another mark, R, up to which it is to be filled with the reagent. The reagent is prepared by dissolving 10 Gm. of picric acid and 20 Gm. of citric acid in enough distilled water to make 1 liter.

Before making the actual assay, the amount of albumin ought to be determined approximately, and the urine, if necessary, diluted so that it may not contain more than about 0.4 per cent of albumin. The tube is then filled with the urine to the mark U, enough reagent poured in to fill the tube up to R, the tube closed with the finger and gently reversed several times so that urine and reagent become intimately mixed. The tube is then closed with the rubber stopper, and set aside for twenty-four hours at the ordinary indoor temperature, after which time the height of the sediment is read off. Supposing the latter to reach to 4, then the urine contains 4 Gm. of albumin in 1 liter, or 0.4 Gm. in 100 C.c. As the highest number on the tube is 7, this corresponds to an amount of 0.7 Gm. in 100 C.c. Hence if the urine were to contain more albumin than 0.7 per cent, it would have to be suitably diluted.

It has been ascertained by Ritter that this test gives unreliable results when antipyretics had been administered.

The method is also in other respects not entirely trustworthy. However, if it is used to determine the relative increase or decrease of albumin in the urine of one and the same person at successive periods, the adhering errors are reduced to a minimum.

Another method of estimating albumin has been proposed by Brandberg. This method is less affected by errors than the preceding. It depends upon the appearance or non-appearance of a turbidity in a series of samples of the urine, acidulated with nitric acid, and of various though known dilution. It is executed as follows:

First prepare a 10-per-cent solution of the urine by mixing 5 C.c. of it with 45 C.c. of water. Place upon the bottom of a test tube, without touching its sides, by means of a pipette, 3 to 5 C.c. of nitric acid, and on top of the latter, likewise with a pipette, some of the diluted urine. (If more than 1 part of albumin in 40,000 is present, there will be a more or less prominent white ring or turbidity appearing at the line of contact of the two liquids.) If the turbidity appears within two and one-third to three minutes, the diluted urine used contains one-three-hundredths per cent of albumin; hence the undiluted urine 0.033 per cent. If the turbidity appears later, or not at all, then the amount of albumin in the undiluted urine is less than 0.03 per cent. If it appears earlier, it is more than 0 03 per cent. In this case the urine must be further diluted until that rate of dilution is found in which the turbidity will appear within two and one-third and three minutes. For this purpose five test tubes are selected and numbered. Into each are put 2 C.c. of the diluted (10 per cent) urine, and certain amounts of water added to each, viz., to I., 4 C.c.; to II., 13 C.c.; to III., 28 C.c.; to IV., 43 C.c.; and to V., 58 C.c. The original test is now applied to each of these mixtures successively. If one of them produces the white ring or turbidity with nitric acid at the end of three minutes, it contains 0.0033 per cent of albumin. But if it appears earlier, or later, or not at all, other dilutions must be made, to hit the point when the turbidity makes its appearance just at the end of three minutes.

The amount of albumin in the original urine is calculated by adding the number of cubic centimeters of diluted (one-tenth) urine used (namely, 2) and the number of cubic centimeters of water added, and dividing the obtained sum by 60.

This method is stated by Hammersten to give very close results, the error usually being less than 0.206 per cent.

BIBLIOGRAPHY.

[Chemical Reagents.] Uses, Tests for Purity, and Preparation of Chemical Reagents, employed in Qualitative, Quantitative, Volumetric, Docimastic, Microscopic, and Petrographic Analysis, with a Supplement on the Use of the Spectroscope. By Chas. O. Curtman, M.D., Prof. of Chemistry, etc., Missouri Med. College. With 12 plates. 8vo. St. Louis, 1890.

This book is unique. We have carefully perused the text while it was in course of publication in a St. Louis pharmaceutical journal (*Meyer Brothers' Druggist*), and have taken from it many a nint which will be useful to us in our daily work. A systematic treatment of the subject of reagents—carried out more fully than is customary in text books on analytical chemistry or feasible in laboratory instruction—brings together a variety of points which are apt to escape one if the reagents are looked upon merely as the tools with which work is to be done. The present book bears every evidence of representing many years' study and accumulation of facts on the part of the author. The chapter on the use of the spectroscope particularly evidences the author's thorough familiarity with this subject. The book will be used with profit by every one who is engaged, professionally or only occasionally, in analytical work.

A Manual of Pharmaceutical Testing for the Man of Business and his Assistants, comprising simple Instructions for the Testing of the Chemicals of the British Pharmacopœia, etc. By Barnard S. Proctor, F.I.C. 8vo. London (Office of *Chemist and Druggist*), 1890.

This handy little volume contains an amplification of the tests given by the Brit. Pharm., not only of the "chemicals" (to which the title would seem to restrict it), but also other official substances, such as opium, oleum olivæ, pepsinum, etc., etc. Besides the official tests, which are suitably explained and commented upon, a number of others are added, with many practical hints on manipulation. The subject of the assay of vegetable drugs is not touched upon, except where the Pharmacopœia itself requires it; for instance, under Ext. Nucis Vom., Opium, Spir. Ætheris Nitrosi, etc. The last-named article is particularly well treated. We can recommend the little book as being very useful also to the American pharmacist.

Immunity through Leucomaines. By Eusebio Güell Bacigalupi. Translated from the second French edition by R. F. Rafael, M.D. New York: J. H. Vail & Co. Pp. 170, 8vo.

Attracted by the results of inoculations upon domestic animals for the prevention of zymotic diseases, the author has attempted, by reasoning rather than by experimentation, to establish as a principle that the microbes which cause disease are not capable of development in the person in whom exist the leucomaïnes which are formed during the development of these microbes; or, to quote one of his conclusions: "Vaccination, to preserve from an infectious distemper, should, therefore, consist in introducing into the organism by artificial means the leucomaïnes of the microbe that produces the disease against which protection is sought."

Catalogue of Soda Fountains and Counter Fronts made by the Low Art Tile Company, Chelsea, Mass. Printed by the Forbes Co., Boston and New York.

It is some time since this beautiful piece of work came to hand, but we now ask the attention of those who contemplate the purchase of an apparatus or store fixtures to look into the merits of these wares. From an artistic standpoint they far excel anything else that we have ever seen. With all the richness of color possessed by marbles, they are capable of affording much more graceful outlines and details. Their durability is equally great, and, in the event of breakage, the injured portions can be replaced at a comparatively nominal cost.

Transactions of the Medical Society of the State of New York for the year 1890. Pp. 490, 8vo. Published by the Society (F. C. Curtis, M.D., Secretary, Albany, N. Y.).

Since its organization in 1806 this Association has been most actively engaged in advancing the medical sciences, and its published reports always contain many valuable contributions by men of eminent ability. The present volume is no exception, and aside from matters of purely scientific importance contains the text of recent laws affecting the medical profession.

Practical Sanitary and Economic Cooking. Adapted to Persons of Moderate and Small Means. By Mrs. Mary Hinman Abel. The Lomb Prize Essay. Published by the American Public Health Association. 1890, pp. 190, small 8vo.

Mr. Lomb, of Rochester, N. Y., offered prizes in 1888 for the best two essays on the subject expressed by the above title, and this work is the one ranking first. While there is great need for a better knowledge, among people of limited means, of the best methods for gaining the best nutriment for the money expended, much which has already been written has been founded upon foreign experience and methods, and is but imperfectly adapted to the social needs and food resources of this country. The work here noticed is not amenable to this criticism, and can be studied with profit by all with whom economy and not parsimony is desirable. To enable the book to reach those for whom it is intended, it is sold through all book stores at the cost of publishing it.